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

8–11 April 2008

Burnham-on-Crouch, UK

ICES International Council for the Exploration of the Sea

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 at CEFAS in Burnham-on-Crouch from 8–11 April 2008. About 60% the ICES member countries were able to supply figures for marine aggregate extraction; however the figures likely account for the majority of the total marine aggregate extracted in 2007. The majority of the extraction takes place from the North Sea and the English Channel, with additional extractions in the North Atlantic primarily by France. Activity in the Netherlands and the United Kingdom accounted for 65% of the total extractions. The main use for marine aggregates continues to be for construction (45%) and beach recharge (36%), with additional volumes used for land reclamation in the Netherlands. Less than 10% of marine aggregate is exported.

Maasvlakte 2, the enlargement of Rotterdam Harbour in the Netherlands, is scheduled to begin in 2008. Over the next five years, dredging is expected to proceed at a rate of about 150 million m^3 per year which will be used as bulk fill for reclamation. An extensive monitoring program is proposed to include scrutiny of the bathymetry, seabed sediment composition, suspended sediment, benthic fauna, underwater noise, and algae blooms.

ICES WGEXT has again collated available information for OSPAR countries on the annual amounts of sand and gravel extraction and the area dredged in comparison to the area licensed. Areas in which extraction occurred were much smaller than the areas licensed and, of course, the actual, spatial footprint should be used to assess impacts.

ICES WGEXT also reviewed and reported programmes of national mapping of the seabed which include not only geological mapping, but also specific efforts to map benthic habitats and, at least in Spain, biodiversity mapping. All countries are engaged in both routine and specialized resource mapping although the implementation is distributed among a variety of different agencies and programmes. In addition to the proposed monitoring for Maasvlakte 2, a review of approaches to Environmental Impact Assessment and research of member countries in the field of marine sediment extraction highlighted the use of an automatic identification system (Denmark) and of black-boxes to monitor extraction activity. WGEXT reviewed and evaluated the use of ICES Extraction guidelines across member countries. Although use of the guidelines continues to be quite variable, most members do refer to the guidelines in national regulatory frameworks, and some make more explicit reference to some or all the provisions in statutory regulations. Few changes to legislative and administrative frameworks were also reviewed and reported.

In 2008, the group reviewed the output of other, relevant ICES working groups. The Benthos Ecology Working Group (BEWG) compliments discussion of monitoring of the environmental effects of extraction of marine aggregates. The Bureau Working Group Data Development Project intends to develop and maintain accessible marine databases.–The ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB) will be conducting integrated assessments for Baltic Sea, the Working Group for Regional Ecosystem Description (WGRE) is to provide the characteristics of each of the different ecosystems included in the ICES zones, the Working Group on Integrated Coastal Zone Management (WGICZM) examines the interaction, of extraction, in this case, with the other activities, and the Working Group on Marine Habitat Mapping (WGMHM) is relevant to deciding extraction

areas to protect living marine resources. Also discussed were international and programs for mapping, monitoring and modeling marine resources.

The final draft of the ICES WGEXT Co-operative Research Report was prepared and will be submitted to ICES for final editing and publication. The outline of the next co-operative research report will be arranged intersessionally by the designated chapter leaders.

ICES WGEXT agreed to meet again in 14–17 April 2009 in New York as guests of the School of Marine and Atmospheric Sciences of Stony Brook University.

1 Introduction

The Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) was welcomed to CEFAS by David Carlin. Mr Carlin gave an overview of the work and history of CEFAS, the work undertaken by the Burnham laboratory and CEFAS' role in the development of ICES. Dr Joe Horwood, the CEFAS Chief Scientist and current ICES president sent his warm regards and best wishes for a successful meeting of the working group. The chair of WGEXT thanked CEFAS for hosting the annual meeting and all countries for providing national reports. The meeting will include a visit to a restoration project on Wallasea Island at the hospitality of the Crown Estate and a working group meal courtesy of BMAPA.

The Chair, Mr Sutton, also thanked all WGEXT members who had contributed to the cooperative report throughout the year and those who had provided electronic submissions for the annual report in advance of the meeting. He noted that the Cooperative Research Report was near completion. Final editorial revisions are intended to be completed at this year's annual meeting. Mr Sutton mentioned the Maasvlakte 2 Project; a report of progress on this project will be presented later at this meeting.

Terms of Reference (ToRs), Opening of meeting, and Adoption of agenda

2007/2/MHC09 The Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem [WGEXT] (Chair: Mr. Gerry Sutton, Ireland) will meet in the United Kingdom from 8–11 April 2008 as guests of Cefas, BMAPA and the Crown Estate in order to:

a) provide a summary of data on marine sediment extraction for the OSPAR region that seeks to fulfil the requirements of the OSPAR request for extraction data to be provided by ICES and take into account any feedback or comments from OSPAR on the information submitted by WGEXT 2007;
b) review data on marine extraction activities, developments in marine resource and habitat mapping (taking into account some of the outputs of the ICES WGMHM as appropriate), information on changes to the legal regime (and associated environmental impact assessment requirements) governing marine aggregate extraction;
c) review scientific programmes and research projects relevant to the assessment of environmental effects of the extraction of marine sediments including interaction with the COST programme;
d) initiate work on a new Cooperative Research Report to cover the period 2005 to 2008;
e) continue to review and evaluate the use and application of the ICES WGEXT 2003 Guidelines across member countries;
f) review the outputs from other relevant ICES working groups relevant to the work of WGEXT;
g) continue to review and evaluate the scope and implementation of monitoring programmes instigated in relation to marine sediment extraction activities.

Supporting Information

PRIORITY:	Current activities are concerned with developing the understanding necessary to ensure that marine sand and gravel extraction is managed in a sustainable manner, and that any ecosystem (and fishery) effects of this activity are better understood so that mitigative measures can be adopted where appropriate. These activities are considered to have a very high priority.
SCIENTIFIC JUSTIFICATION:	(a) This work responds to a request from OSPAR to gather data for the entire OSPAR region on aggregate extraction activities. This information is to be provided and collated in advance of the meeting and reviewed in relation to item (b). We aim to seek the support of existing WGEXT members and participants in an attempt to improve and extend reporting of national data to WGEXT in order to satisfy the OSPAR request. (b) & (c) An increasing number of ICES Member Countries undertake sand and gravel extraction activities and others are looking at the potential for future exploitation. Each year relevant developments under these headings are reviewed and summarised. This provides a useful forum for information exchange and discussion. National reports are submitted electronically prior to the meeting. National Reports should be submitted, using the new reporting template, no later than 16th March 2008. (d) To respond to any feedback received to ensure the report accurately reflect the needs of ICES and OSPAR. (e) WGEXT wish to begin to review the 2003 WGEXT Guidelines to ensure they remain fit for purpose across member countries and take account of developments in the underpinning science. (f) An increasing amount of monitoring activity takes place in connection with licensed aggregate extraction across ICES member countries. WGEXT wish to consider the scientific robustness and rationale behind the design, implementation and effectiveness of such monitoring activities.
RELATION TO STRATEGIC PLAN	The principal focus of WGEXT work is in relation to Action 2.13 of the ICES Action Plan 2003-2007.
RESOURCE REQUIREMENTS:	Most countries collect data and information routinely on aggregate extraction activities. The additional work in presenting these data in a standardised form for the new electronic template is considered small, but in the long-term should result in a reduction in effort. Reviews of research activity are of programmes that are already under way and have resources committed.
PARTICIPANTS:	WGEXT is normally attended by 20–25 members and guests.
SECRETARIAT FACILITIES:	Finnish Environment Institute
FINANCIAL:	No additional financial implications
LINKAGES TO ADVISORY COMMITTEES:	ACOM
LINKAGES TO OTHER COMMITTEES OR GROUPS:	BEWG, WGMHM, REGNS
LINKAGES TO OTHER ORGANISATIONS:	Work is of direct interest to OSPAR and HELCOM.

2 Provide a summary of data on marine sediment extraction for the OSPAR region that seeks to fulfil the requirements of the OSPAR request for extraction data to be provided by ices and take into account any feedback or comments from OSPAR on the information submitted by WGEXT 2007 (ToR a)

ICES WGEXT have again attempted to provide information for all OSPAR 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. Available information is included in Table 1 below.

Table 1. Summary Table of National Aggregate Extraction Activities in 2007.

Country	A) Construction/ Industrial Aggregates (m³)	B) Beach Replenishment (m³)	C. Construction Fill/ Land Reclamation (m³)	D) Non-aggregate (m³)	E) Total Extracted (m3)	F) Aggregate Exported (m³)	New Maps Available	New Legislation	New Policy	EIA Initiated	EIA Ongoing	EIA Finished	EIA Published
Belgium	1,539,699	450,146		0	1,989,845	N/d	Yes[3]	No	No	No	No	No	No
Canada	0	0		0	0	0	N/d	No	No	No	No	No	No
Denmark[1] (HELCOM)	3,670,000				3,670,000	350,000	No	No	No	N/d	N/d	N/d	N/d
Denmark[1] (OSPAR)	2,820,000	2,140,000		0	4,970,000	0	No	No	No	N/d	N/d	N/d	N/d
Estonia	N/d	N/d		N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Finland	0	0		0	0	0	Yes	No	No	Yes	Yes	Yes	No
France	5,934,000	0		495,700	6,429,700	0	Yes	No	No	Yes	Yes	Yes	No
Germany (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
Germany (OSPAR)	109,248	1,317,262		0	1,426,510	0	No	No	No	No	Yes	Yes	No
Greenland and Faroes	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	N/d	N/d		N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Ireland	0	0		0	0	0	Yes	No	No	Yes	Yes	No	No
Latvia	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	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	1,900,371	15,184,709	11,216,305	243,2802	28,413,475	2,900,000	Yes[3]	No	No	Yes	Yes	Yes	Yes
Norway	N/d	N/d		N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Poland	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	N/d	N/d		N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d	N/d
Spain	0	26,906		0	26,906	0	Yes	No	No	No	No	Yes	No
Sweden	0	0		0	0	0	Yes	No	No	No	No	Yes	No
United Kingdom[4]	12,724,124	1,264,165		0	13,988,289	4,005,447	Yes	Yes[5]	Yes	Yes	Yes	Yes	Yes
United States[6]	1,225,000	3,529,000		0	4,754,000	0	No	No	No	No	No	No	No

NB With the view to improving clarity to OSPAR, WGEXT have amended Table 1 from the structure submitted in 2007. The columns now included are as follows:

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 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]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.

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

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

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

[5] New legislation has been prepared in England and Northern Ireland, with further legislation planned for Wales and Scotland. New legislation for England and Northern Ireland came into force from May 1st 2007.

[6] Figures reported for USA pertain to Eastern Seaboard only

WGEXT will again circulate a copy of the WGEXT 2008 annual report to contact points provided by OSPAR BDC in order that the accuracy of the information presented can be assured. As reported last year, it was agreed that the WGEXT annual report should again only consider the extraction of marine sediment which is assessed and licensed for a specific purpose.

Similar to previous years, a number of countries (summarised in the following table) did not provide data to the WGEXT 2008 annual report.

Table 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 2006)
PORTUGAL
ICELAND
GREENLAND AND FAROES (DENMARK)
OSPAR COUNTRIES REPORTING TO ICES WGEXT BUT NOT ANNUALLY IN RECENT YEARS
GERMANY
NORWAY
DATA ADJUSTMENTS FOR SPECIFIC COUNTRIES NECESSARY TO DISTINGUISH DATA FOR THE OSPAR REGION
SPAIN – Atlantic coast activities only (exclude Mediterranean)
FRANCE – Atlantic coast and English Channel activities only (exclude Mediterranean)
GERMANY – North Sea activities only (exclude Baltic)
FINLAND – Exclude Baltic activities
SWEDEN – Delineate activities in the Baltic area which fall within the boundaries of the OSPAR 1992 DENMARK – As for Sweden

In response to an earlier OSPAR request to provide data on the area dredged in comparison to the area licensed, table 3 has been updated in 2008. Table 3 summarises information 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, of course, the actual, spatial footprint should be used to assess impacts.

Table 3. Licensed area and actual areas over which extraction occurs.

	Licensed Area Km²*			Area in which extraction activities occur Km²		
Country	2004	2006	2007	2004	2006	2007
Belgium (Zone 1)	300	No data	No data	9	No data	No data
Belgium (Zone 2)	228	No data	No data	19	No data	No data
Belgium Total	528	No data	No data	28	No data	No data
Denmark[1]	800	No data	450	30	No data	No data
France[1]	35.43[2]	73.08[2]	No data	N/a	No data	No data
Germany[1] (OSPAR)	N/a	No data	No data	N/a	No data	No data
Germany (Non OSPAR) [1]	N/a	No data	No data	N/a	No data	No data
Netherlands	484	453	456	41	47	38[4]
UK	1,257	1,316	No data	134[3]	140[3]	No data

[1]As reported in ICES WGEXT 2005 Annual Report

[2] Includes 26.59 sand-and-gravel extraction area and 8.84 non-aggregate extraction area in 2004 , and 58.46 sand-and- gravel extraction area and 14.62 non aggregate extraction area in 2006.

[3] 90% of material extracted in UK is taken from 46km² (2003) and 43km² (2004) and 49.2 km² (2006)

[4] 90% of material extracted in the Netherlands is taken from 9.2km² (2007).

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. WGEXT also noted and welcomed the OSPAR request to continue to provide data on sand and gravel extraction. WGEXT also agreed to forward a copy of the final draft of the ICES Cooperative Report to OSPAR EIHA HOD as soon as it becomes available.

3 Review of national marine aggregate extraction activities (ToR b (i))

Two principal types of extraction operations were considered. The first concerns sediment generated by an extraction activity that is assessed and licensed for a specific purpose including those for construction, beach nourishment. or reclamation purposes. The second was sediment specifically extracted for beach nourishment. The detailed data and information submitted by individual countries can be found in Annex III, a summary of which is also given in Table 1 (above).

Extractions in 2007 remained fairly stable; they were similar to those in 2006. The largest total extraction (28.4 million m^3) was from the Netherlands, followed by total extractions by the United Kingdom (13.9 million m^3). Finland and Ireland, which had limited extractions in 2006, reported no extractions in 2007. There were also no extractions from Sweden.

Spain recovered only 0.026 million m^3 which was used for beach nourishment. There have been noticeable increases in the amounts of extractions used for beach nourishment. The United States recovered 3.59 million m^3, the Netherlands 15.2 million m^3, and Belgium 0.59 million m^3. Over the years, the west coast of Jutland in Denmark showed a pronounced increase from 40,000 m^3 in 1980 to more than 2.14 million m^3 in 2007. Germany also reported substantial volumes of sand extracted for the purposes of beach nourishment, similar to last year's (2006) activity. France recovered the largest volumes of non-aggregate material (0.59 million m^3); the Netherlands recovered about half that volume of non-aggregates ((0.249 million m^3). Four million cubic meters were exported from the United Kingdom, 3 9 million m^3 from the Netherlands and 0.359 million m^3 from Denmark. No other countries reported exports in 2007.

No reports were received from Canada, Estonia, Iceland, Latvia, Norway, Poland, Portugal or Russia. Whilst slightly over half of the ICES countries were able to supply data, this is thought to provide a representative assessment of the overall total of material extracted from the member states. The majority of extraction takes place from the North Sea area, with lesser amounts from the ICES part of the Baltic Sea Area, the English Channel the Irish Sea, and North Atlantic. In keeping with the previous years' trend the figures show that material destined for beach replenishment accounts for a significantly smaller proportion of the overall take than material destined for the commercial/construction market.

4 Developments in marine resource and habitat mapping (ToR b (ii))

All participating members reported continuing mapping activity. Although no new maps were published in Belgium in 2007, the Sand Fund advances the effort on a regular basis. The Geological Survey is mapping submerged Quaternary deposits in Finnish waters and marine habitat mapping is being done by the Finish Inventory Program. In France, IFREMER collaborates with the French Geological Institute for resource mapping in the EEZ. A similar effort to map the entire EEZ in the Netherlands is undertaken by the Institute of Applied Geosciences in collaboration with the Navy.

Ireland continues to make progress on completing the INFOMAR programme (formerly Irish National Seabed Survey), and, in Sweden, new mapping is being done in the Skagerrak area as part of a new (the first) national park in Sweden. Biodiversity and habitat mapping is being done along the Basque coast to a depth of 100 m in

Spain. While there is no coordinated effort in either the U.K. or the U.S. both geological mapping and habitat delineations are being done by various agencies.

5 Review of developments in national authorisation and administrative framework and procedures (Term of Reference b (iii))

The UK was the only country who identified significant change to their marine aggregate administrative and regulatory regime. In England, Northern Ireland and Wales, statutory regulations were introduced for the first time in May 2007 together with changes to the procedure of the marine aggregate extraction regime.

6 Review scientific programmes and research projects relevant to the assessment of environmental effects of the extraction of marine sediments including the interaction with the cost programme (ToR c))

Finland reported on the completion of two EIA's in the Gulf of Finland and in the Bothnian Sea and the start of several EIA's in the Bay of Bothnia.

France reported on the extension of the research programme led in Dieppe from 2004 to 2006, on a new experimental site in Baie de la Seine. The main objectives of this programme are 1) to validate the assessments of impacts on benthos, fish and trophic relationships, in a different environmental context; 2) to focus on the recolonisation process during 3 years by testing the levelling of the seafloor after 1 year of extraction; 3) to study the evolution of the turbid plume in the 2 sites for further modelling.

In the U.K., research in third round of the Aggregates Levy Sustainability Fund (ALSF) ended in March 2007, and the fourth round commenced in April 2007. Projects focus on marine mapping, assessment of environmental impacts, monitoring / mitigation associated with improving the way marine aggregate extraction is planned, assessed and managed. To support a forthcoming large number of licence and renewal applications, the UK marine aggregate industry has also commissioned a series of Regional Environmental Assessments to address regional scale cumulative and in-combination issues. Once completed, the REA's will form a reference for the required site specific EIA's produced in support of each specific licence or renewal application.

The first annual sustainable-development data for the British Marine Aggregate Sector defines a range of key performance indicators for the industry to report under the themes of economic growth, social progress, environmental protection and natural resources. The socio-economic contribution made the industry in supporting construction activity, coast protection schemes and exports was the subject of a further report of the British Geological Survey.

Ireland reported on an EIA for a potential extraction of fill material for reclamation for the Port of Cork.

The Netherlands reported on two EIA procedures for marine extraction that are in place for the period 2008–2012 and the years 2008–2017. In both EIA's deep extraction (6 metres below the sea bed) is studied as an environmental friendly alternative. One EIA was approved for licensing. Monitoring on e.g. underwater noise was advised. The second EIA is published in April 2008 for public consultation till the end of May 2008.

The procedure of public consultation and formal advice of the EIA for the sand extraction for the enlargement of the harbour of Rotterdam has concluded. The results

are being used for formulating of licensing conditions for the extraction of a maximum of 365 million m^3 within a period of 2008–2033. To evaluate the effects predicted by the EIA an extensive monitoring programme will be executed. For details see Annex VII.

In Sweden the implementation of the National Swedish Marine Environmental Strategy has evolved. As a result of the Swedish Marine Action produced in April 2006, a governmental proposition will be made to the Parliament in 2008.

In the United States the U.S. Minerals Management Service Guideline for obtaining offshore sand sources were made public. Special attention is given to the possible deflation of shoal features that may result in adverse changes in sand transport patterns, shoreline erosion, and accretion rates.

There were reports on a number of related research projects conducted in the different countries. These include a study on the cumulative effects both in space and in time of adjacent extraction activities and research related to extraction and coastal nourishment that will support the management of the coastal zone executed in the Netherlands. France finalized work that contributes to the knowledge of "the Impact of the marine material exploitation on the stability of the littoral".

In the UK the wider impacts of marine aggregate extraction, including restoration of the seabed post aggregate dredging is studied. In Ireland benthic communities were described at sand banks off the Irish Eastern seaboard in the light of the EU Habitats Directive. For details of the projects see Annex VII.

No new activities were reported in Spain, Belgium and Denmark. No reports were received from Canada, Estonia, Germany, Iceland, Latvia, Norway, Poland, Portugal, or Russia

Interaction with COST Programme (MAGGNET – Marine Aggregate Network)

WGEXT reviewed the preliminary work of the MAGGNET EU COST Action 638. Details of this program can be found at < www.maggnet.info/show.php?p=231>. WGEXT emphasised the long term and continuing nature of its responsibility for providing considered expert advice to both ICES and OSPAR and recognised the potential added value of the network of researchers with mutual interest in marine aggregates envisaged within MAGGNET, to compliment some areas of the work of WGEXT. In particular WGEXT recognises the value of the scope that MAGGNET provides to facilitate engagement with representatives from more southern European countries, and also the value of short term scientific missions that facilitate minor research. There is also a connection to the GeoSeas project through MAGNET. This FP7 Research Infrastructures project builds on Seadatanet, Euroseismic and Eurocores projects and aims to facilitate improved access to geological data of all types. It will also develop enhanced data products of direct relevance to many WGEXT objectives.

7 Address any comments made on the Co-operative Research Report by ICES MHC, ICES ACME and OSPAR BDC / EIHA and begin preliminary scoping for the next Cooperative Research Report (Term of Reference d)

The report on the **Effects of Extraction of Marine Sediments on the Marine Ecosystem** will be published in the *ICES Cooperative Research Report* series. The estimated number of pages is 150. The outline of a proposal for the next Cooperative research report will be arranged intersessionally by the following people who will take the lead on each chapter.

Chapter 1. Gerry Sutton

Chapter 2. Mark Dutton (?)

Chapter 3. Ingemar Cato

Chapter 4. Mark Russell

Chapter 5. Chris Dijkshoorn

8 Review and evaluate the use and application of the ICES WGEXT 2003 guidelines across Member Countries (ToR e)

Most WGEXT countries present at the 2008 annual meeting reported using the WGEXT guidelines as a checklist to assess the quality of EIA's submitted in support of applications to extract marine aggregates or include them in guidance for the production of EIA's.

In the Netherlands and UK the guidelines are used as a checklist for assessing and as guidance in the production of EIA's. In Belgium the guidelines were utilised to assist in setting up new national legislation pertaining to marine aggregate extraction. Finland, uses the guidelines of the HELCOM Recommendation 19/1 of 1998 titled "Marine Sediment Extraction in the Baltic Sea Area", as do the other HELCOM areas. France reported ongoing work to update national guidelines that will take into account the ICES WGEXT guidelines. In Ireland and Sweden extraction does not take place at present but it was reported that as and when it does, the guidelines would be used, with Ireland in particular reporting that the guidelines would likely be incorporated into any national legislation governing marine aggregate extraction. The USA has its own national guidelines which cover similar issues to the ICES WGEXT guidelines. Following the OSPAR 2003-15 recommendations, the ICES WGEXT guidelines have been translated into Spanish and distributed to all concerned authorities in Spain.

WGEXT will review the 2003 Guidelines on the occasion of their fifth anniversary at the next (2009) meeting. Although the guidelines as written continue to be comprehensive and authoritative reference document to assess the impacts of marine aggregate extraction, revisions should be made in light of the past five years' experience in the member countries. In addition, it may be appropriate to include reference to the carbon footprint of dredging activity the section "Description of the proposed dredging activity". It was not considered necessary to prioritise specific issues as issues / impacts would vary across the many different environments and dredging strategies found within member countries. In October, 2008, Mr. Ad Stolk will request input from the WGEXT members on this topic and on the use of blackboxes in the member countries.

9 Consider the scope and implementation of monitoring programmes instigated in relation to marine sediment extraction activities (ToR f)

Black-box data are used in Belgium not only as control tool but also to see where most extraction is taking place so that the regulatory administrations can take measures when a certain area is being extracted too much and where a risk might appear of creating depressions in the sand banks. Data can be used to calculate the extracted amounts per vessel and per permit holder, to determine the geographical position of the extraction vessels during extraction, to find the average time of extraction per vessel, and the total number of trips.

Ad Stolk addressed the Group concerning the monitoring plans for Maasvlakte 2, the enlargement of Rotterdam Harbour. The project is scheduled to begin in 2008. When it is completed in 2013, the harbour facilities will have expanded by 20km2 of made land. About half of this area will be industrial and about half devoted to infrastructure. In addition, because the project is completely within the preserve of "Nature 2000" a compensation area is to be included that will be about ten times the area of the new harbour footprint. The entire project must be designed in the context of both federal and local laws.

Compliance monitoring is routinely done in the Netherlands where excavations to date have not exceeded 2m below the seabed. This project will create borrow areas 6 to 10 meters depth in waters beyond the 22-meter isobath. Side slope of the excavation are required be remain below 1:7 in order to avoid separation flow at the edge of the borrow pit, and the consequent increased potential for development of anoxic conditions. Dredging is intended to proceed at a rate of about 150 million m^3 per year.

A 6000 page EIA has been completed (in Dutch with short summary in English). No dredging windows were imposed because of the frequency of storms naturally subjects the entire area to disturbance.

Baseline monitoring has been completed at 300 benthic stations. These will continue to be monitored throughout the project. In addition, about 100 locations were sampled for fish. Monitoring of fish populations will not continue, however, as the EIA concluded that there would be no significant impacts on fish. Monitoring will be done in six arenas.

1) Bathymetry: Surveys are to be undertaken in and around the dredging area every month during the project. Post-project surveys will be done annually for five years and then every five years until the dredged area is deemed to be "comparable to the natural seabed".

Discussion: At this point, comments were made by the working group. First, the RIACON project monitoring data suggests that the borrow areas redevelop sand waves, without filling, in about eight years. If this is the criteria upon which comparability is based, it may be reached before the end of the first 5-years period. It was suggested that a minimum of three five-yearly surveys, to 20 years after completion should be required, even if the "comparability" criteria are met.

The criteria by which the borrow areas will be deemed comparable to the natural sea bed have not yet been specified, but one criteria might be the occurrence of natural, sand-waves.

The definition of the "surrounding area" may need some attention. The pits may create a very large sand deficit which could affect a substantial area beyond the immediate extraction site. The expected area-of-influence extending a few kilometres from the dredged areas may, in fact, be larger. Assuming that a complete sediment budget and, hence, complete, bathymetric coverage over the affected area, is not intended, two approaches were mentioned. First, bathymetry on widely-spaced, repeatable, corridors may be sufficient to ensure "comparability" over a large area; perhaps one of unknown extent. Second, separate, non-contiguous reference areas might be chosen in which complete coverage is done on the same schedule as that in the dredged area. Comparability is then assessed statistically between the reference areas and the borrow areas.

2) Seabed sediment composition. Grains size will be monitored twice a year around the excavation areas during dredging and then every five years until the dredged areas become comparable to the natural seabed.

Discussion: The working group raised three issues. First, as with the bathymetric monitoring, the size of the area monitored and the criteria by which comparability will be assessed both need to be well defined, although the monitoring plan should allow some latitude for ongoing adjustments. Second, geotechnical properties of the surficial sediments should be assessed. Degree of compaction, for example, can be measured with penetrometers some of which are quick and disposable. Third, substrate type is typically well correlated with the benthic population as well as being modified by the benthic organisms. A five-year sampling period may be too long. The suggestion was made that sampling be conducted every year for the first five years, perhaps scheduled at the time of benthic recruitment in the spring.

3) Suspended sediment. Dredging will be done using trailing hopper dredgers. Areas that were previously determined to have high mud content will be avoided and restrictions will be imposed to control overflow. Control of suspended sediment is intended to reduce impacts on primary production and impacts on sight-feeding birds. Monitoring is intended to be done by satellite imagery, calibrated by shipboard sampling. Measured surface concentrations will be used to predict the vertical distribution of suspended sediment, surface to bottom.

Discussion. It is important to collect shipboard samples simultaneously with the satellite imagery in order to calibrate the remotely sensed data. If cloud cover becomes an issue, perhaps airborne sensors can be used. In Finland, backscatter from ADCP's has been used to rapidly map turbidity. It was pointed out that fish larvae are sensitive to suspended sediment concentrations, even though the EIA had determined that there would be minimal impacts on fish. Thresholds should be set to the extent possible. This may be used an opportunity to conduct research into impacts on fish populations perhaps as a partnership with universities or research institutes.

4) Benthic fauna. Macro faunal species and biomass will be monitored. As mentioned earlier, 300 baseline stations were already established. Sampling is to continue annually until "total recovery".

Discussion. Possible difficulties in determining "total recovery" was discussed. This raises the issue, as before, of the area covered and the duration of the monitoring. Other programs have used biomass and diversity or species richness to compare dredged areas with reference (or control) area. In addition, there is some evidence

that meiofauna may be more sensitive indicator of impacts to the benthic conditions that macro fauna alone.

5) Underwater noise. Underwater noise is to be measured in order to characterize changes due to the dredging operation. There are no plans to have mammal observers on board but complimentary studies may eventually be initiated.

Discussion. Some measurements of underwater noise during dredging apparently have been made in Australia and a study is planned in the UK. The oil industry (and the military) has been investigating underwater noise. Information may be available from the PAMGUARD project (PAMGUARD.org) Passive acoustic, submerged buoys might be useful in documenting populations and distributions during the project. Investigators of the impacts of windmills are doing microcosm experiments using noise (COWRIE Project, UK.).

6) Algae blooms. Remote sensing is to be used to document algal blooms. Changes in the suspended sediment concentration may shift the timing of seasonal blooms or there may be a change in species, perhaps, to one causing toxic shellfish poisoning.

Discussion: the group pointed out that zooplankton, which is not being monitored might also be important.

Recommendations and draft COUNCIL RESOLUTIONS

9.1 Draft Resolution 1: Future meeting of WGEXT

The Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem [WGEXT] (Chair: Mr. Gerry Sutton, Ireland) will meet in the United States from 14th April –17th April 2009 as guests of the School of Marine and Atmospheric Sciences of Stony Brook University, NY.

a) provide a summary of data on marine sediment extraction for the OSPAR region that seeks to fulfil the requirements of the OSPAR request for extraction data to be provided by ICES and take into account any feedback or comments from OSPAR on the information submitted by WGEXT 2002008;

b) review data on marine extraction activities, developments in marine resource and habitat mapping (taking into account some of the outputs of the ICES WGMHM as appropriate), information on changes to the legal regime (and associated environmental impact assessment requirements) governing marine aggregate extraction;

c) review scientific programmes and research projects relevant to the assessment of environmental effects of the extraction of marine sediments including interaction with the COST programme;

d) continue work on a new *Cooperative Research Report* to cover the period 2005 to end 2008;

e) continue to review and evaluate the use and application of the ICES WGEXT 2003 Guidelines across member countries;

f) review the outputs from other relevant ICES working groups relevant to the work of WGEXT;

g) continue to review and evaluate the scope and implementation of monitoring programmes instigated in relation to marine sediment extraction activities.

It was provisionally agreed that the 2010 meeting would be held in the Netherlands, depending on the progress of Maasvlakte 2.

Supporting Information

Priority:	Current activities are concerned with developing the understanding necessary to ensure that marine sand and gravel extraction is managed in a sustainable manner, and that any ecosystem (and fishery) effects of this activity are better understood so that mitigative measures can be adopted where appropriate. These activities are considered to have a very high priority.
Scientific Justification:	(a) This work responds to a request from OSPAR to gather data for the entire OSPAR region on aggregate extraction activities. This information is to be provided and collated in advance of the meeting and reviewed in relation to item (b). We aim to seek the support of existing WGEXT members and participants in an attempt to improve and extend reporting of national data to WGEXT in order to satisfy the OSPAR request. (b) & (c) An increasing number of ICES Member Countries undertake sand and gravel extraction activities and others are looking at the potential for future exploitation. Each year relevant developments under these headings are reviewed and summarised. This provides a useful forum for information exchange and discussion. National reports are submitted electronically prior to the meeting. National Reports should be submitted, using the new reporting template, no later than 16th March 2009. (d) To synthesis and present in a useful and digestible form scientific advances and examples of best practice that have mainly accrued via the annual meeting reporting process, in order that they can be available to inform practice, policy and broader research agendas, and stimulate further relevant scientific research. (e) WGEXT will continue to review the 2003 WGEXT Guidelines to ensure they remain fit for purpose across member countries and take account of developments in the underpinning science. (f) WGEXT will benefit from scientific advances that are being made by other relevant working groups, and can also scope opportunities for cross fertilisation and avoid duplication. (g) An increasing amount of monitoring activity takes place in connection with licensed aggregate extraction across ICES member countries. There is considerable variation in the scope and outcomes of this. WGEXT will continue to consider the scientific robustness and rationale behind the design, implementation and effectiveness of such monitoring activities
Relation to Strategic Plan	The principal focus of WGEXT work is in relation to Action 2.13 of the ICES Action Plan 2003-2007.
Resource Requirements:	Most countries collect data and information routinely on aggregate extraction activities. The additional work in presenting these data in a standardised form for the new electronic template is considered small, but in the long-term should result in a reduction in effort. Reviews of research activity are of programmes that are already under way and have resources committed.
Participants:	WGEXT is normally attended by 20–25 members and guests.
Secretariat Facilities:	Stony Brook University, NY
Financial:	No additional financial implications

Linkages to Advisory Committees:	ACOM
Linkages to other Committees or Groups:	BEWG, WGMHM,
Linkages to other Organisations:	Work is of direct interest to OSPAR and HELCOM.

10 Close of meeting and adoption of the report

The group adopted the draft report pending addition of agreed material (TOR F, and executive summary), and the meeting was formally closed by the chair Mr. Gerry Sutton. He thanked members of WGEXT for attending and again offered thanks to Mr. Carlin and SYKE. The group gave thanks to Mr. Gerry Sutton for successfully chairing his second ICES WGEXT meeting.

Annex 1: List of contributors to the 2007 report

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Annex 2: Agenda

ICES Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT)

Tuesday 8 April 2008

09.00 – 09.30	
09.30 – 09.50	Welcome by representative(s) CEFAS
	Welcome by WGEXT Chair
	Terms of Reference (see ICES Res. 200/2/MHC09 attached)
	Adoption of Agenda (allocate teams/individuals to action items)
10.30 – 10.45	Coffee
11:00	Terms of Reference item (a) – please supply material on disk/e-mail to David Carlin (CEFAS) at mailto:david.carlin@cefas.co.uk
	Terms of reference item (a) Summary of Extraction Statistics-OSPAR
12.30 – 13.15	Lunch
13.30– 15.00	Complete Terms of reference item (a)
15.00 – 15.15	Coffee
15.15 – 18.00	Terms of reference (b) Review of Activities
	Aim to complete (a) and begin (b) by the end of day 1 (NB gives opportunity to send in any further requests for outstanding data/information

Wednesday 9 April

09.00 – 10.30	Terms of Reference item (b) please supply material on disk/e-mail to David Carlin (CEFAS) at mailto:david.carlin@cefas.co.uk
10.30 – 10.45	Coffee
10.45 – 12.00	Complete Terms of Reference item (b)
12.00 – 12.45	Lunch
12.45 –	Briefing by Mark Dixon Re Fieldtrip

13.00-16.00	Field Trip
Evening	Group Meal
	Aim to complete (b), by the end of day 2
Thursday 10 April	
09.00 – 10.30	Terms of Reference item (c) Research including Maggnet
10.30– 10.45	Coffee
10.45 – 12.45	Terms of Reference item (d)
13:30-15.00	Continue TOR item (d)
15.00-15.15	Coffee
15.15-18.00	TOR (e) and (f)
	Aim to complete (c,d,e,f), by the end of day 2
Friday 11 April	
09.00 – 10.30	ToR (g) Monitoring with special reference to Maasvlakte 2 Project
10.30 – 10.45	Coffee
10.45 – 12.30	Complete outstanding action items and Recommendations for follow-up work Agree initial text of Working Group Annual Report for 2008.
	Aim to complete (d) by lunchtime on day 4
12:30 – 13:00	Lunch and close

Annex 3: Review of national marine aggregate extraction activities

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

3.1 Belgium

Review of national marine aggregate extraction activities

In 2007, 1 539 699 m³ sand was extracted from the Belgian continental shelf by 12 (private) license holders which is more or less the same quantity extracted compared to last year. Extraction took place in sectors 1a, 1b, 2a and 2c and 3a (see figure…). Two licenses were also granted to the Flemish Region (2006). During no sand was extracted by the Flemish Region. The amount extracted during 2007 by the Flemish Region is 450 146 m³ and was mainly taken in sector 2c. This amount of sand was only used for beach nourishment. The licenses for the Flemish Region have the same conditions (reporting, black-boxes, etc.) as licenses for the private sector with one exception: they are exempted from the fee system.

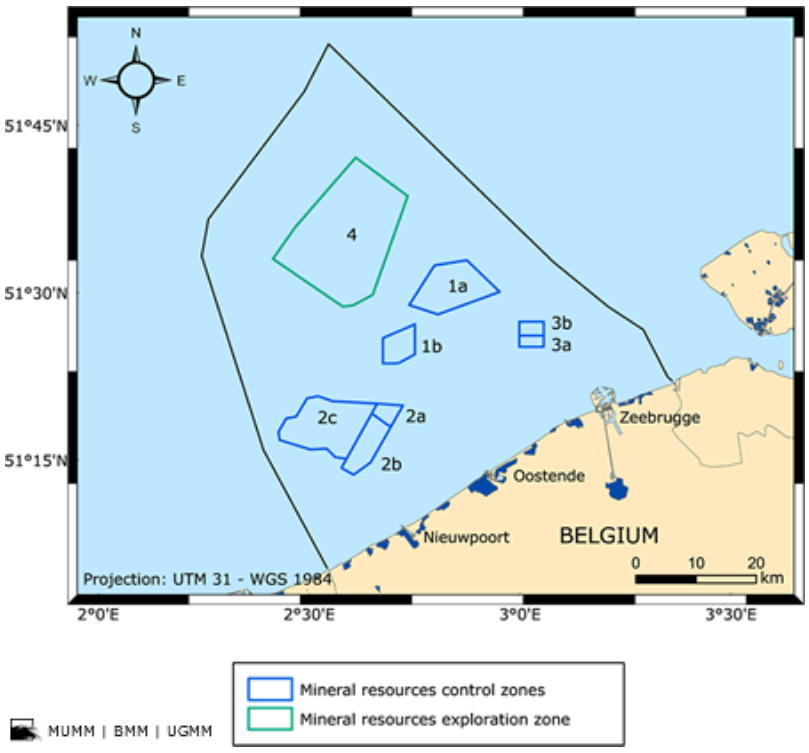
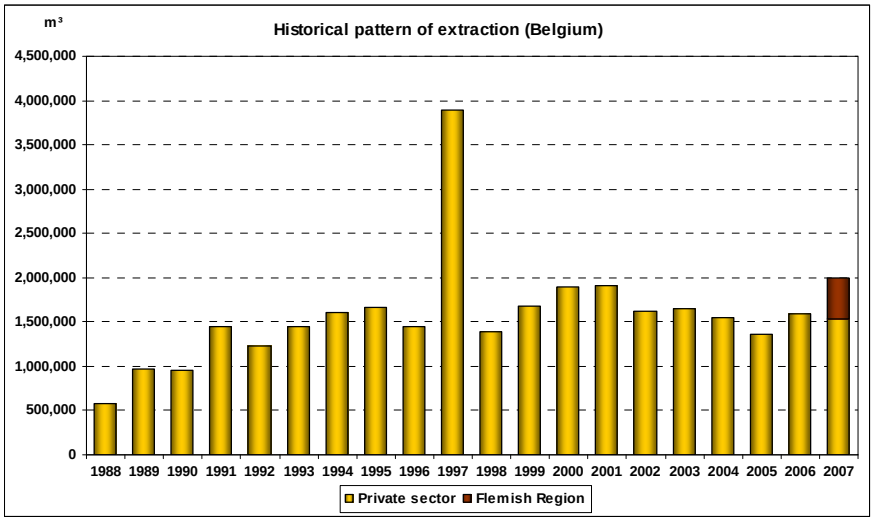


Figure 3.1.1. Map of permitted extraction areas on the Belgian continental shelf.

These sectors are defined by law and extraction can only take place in these sectors. For information, sector 2b is still closed for extraction as was reported in previous years. Sector 3a is still closed since in that sector dumping of dredged material is still taking place. In September 2006 permits were granted for sector 3b and during 2007 a very small amount of sand has been extracted: 3 568 m3 (quantity included in total quantity for the private sector). The decision in principle to also close sector 2a hasn't been implemented yet since the condition to design areas with the same sand quality as in the northern part of the Kwintebank hasn't been fulfilled.

The figure below gives a historical pattern of sand extraction on the Belgian continental shelf since 1988. It should be mentioned that extraction started in 1976 and data are also available since this date. From 2007 onwards the quantities extracted by the Flemish Region are also added in the figure. For clarity these quantities have been put in another colour.



3.2 Denmark

Preliminary marine aggregate (sand and gravel) extraction figures for 2007.

TOTAL EXTRACTION 2007 DENMARK 6.97 MIO. M³			
Sand	Fine Gravel	Coarse Gravel	Sand Fill
1,12	0,41	1,62	1,67

EXTRACTION 2007 OSPAR AREA(1) 4.97 MIO. M³			
Sand	Fine Gravel	Coarse Gravel	Sand Fill
0,34	0,06	1,11	1,31

EXTRACTION 2007 HELCOM AREA(1) 3,66 MIO. M³			
Sand	Fine Gravel	Coarse Gravel	Sand Fill
0,98	0,38	0,90	1,41

(1)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.

Non-aggregate (e.g. shell, maerl, boulders etc) extraction figures for 2007.

DREDGING AREA	MATERIAL	AMOUNT *
Danish sea bed	Shells	check

Description of non-aggregate extraction activities in 2007

Beneficial use of dredged materials from capital dredging

DREDGING AREA	MATERIAL	AMOUNT *
Danish sea bed	Glacial till	0

Exports of marine aggregate in 2007

PORT (LANDING)	AMOUNT*
Sweden	0,20 mio. m^3
Germany	0,15 mio. m^3

Amount of material extracted for beach replenishment projects in 2006.

DREDGING AREA	MATERIAL	AMOUNT *
West coast of Jytland 5 areas	Sand	1,92 mio.. m^3
West coast of Jytland From maintenance dredging	Sand	0.22 mio. m^3
Total	Sand	2,14 mio. m^3

Description of beach replenishment schemes in 2007

The consumption of sand for beach nourishment at the West Coast of Jytland has shown a pronounced increase from 40.000 m^3 in 1980 to more than 3,5 mio. m^3 in 1998 (Figure 3) The consumption in 2007 was 2,14 mio. m^3. Part of the sand comes from maintenance dredging.

Historic patterns of marine aggregate extraction m^3.

YEAR	SAND	FINE GRAVEL	COARSE GRAVEL	SAND FILL
1978	384119	683327	1904767	1612006
1979	346155	634581	1501931	2510836
1980	325511	599196	1558817	1061980
1981	305166	375295	987804	1053639
1982	295824	382439	736976	1860431
1983	762283	490549	739255	1751575
1984	267184	319053	680047	1323477
1985	395987	549108	611723	1063045
1986	341506	545454	653545	1660300
1987	342777	588560	719410	3974459
1988	318613	582879	577566	2086910
1989	1383547	695067	535312	5061802
1990	976751	237504	591975	3935535
1991	1064515	451140	886705	3995591
1992	733971	191837	1095091	2358284
1993	896984	215649	1114988	2095997
1994	1061538	208074	1335400	2569030
1995	1115118	210936	1159739	2820421
1996	886777	196362	1094138	4144540
1997	802537	206378	1547764	3846215
1998	832905	188698	1026735	4613347

Year	Sand	Fine gravel	Coarse gravel	Sand fill
1999	622536	330485	1155375	9927152
2000	648054	377800	1068413	5022076
2001	715250	359826	1151693	3136889
2002	530404	391983	1226755	3425071
2003	638187	341190	1142778	4063704
2004	508907	351710	1140495	4464003
2005	725046	361526	1250777	9018408
2006	834833	325162	1531574	4718571
*2007	1115964	408207	1627504	3814351

The figures from 2007 are preliminary.

Description of historic extraction activities for 1990-2007

The production of construction aggregates has remained stable in the last 5 years.

The dredging of sand fill for land reclamation has varied markedly during the last 15 years caused by several large construction works in coastal areas eg. the Great Belt tunnel and bridge project, the fixed link between Denmark and Sweden and several enlargements of the Århus Harbour.

The first phase of a major enlargement of the harbour of Århus has required more than 8 mio. m³ of sand fill. The sand was dredged 1998 - 2000 from 2 areas in Århus Bight. The second phase of the Århus Harbour enlargement was carried out during 2004 - 2006. A total of 4,8 mio. m³ has been dredged in 2005 and 1,7 mio. m³ in 2006.

In 2003–2004 a total of 1 mio. m³ has been dredged from three areas in the Baltic for a new artificial beach resort near the island of Amager, Copenhagen.

A further 11 mio. m³ is expected to be dredged in the coming years for the third phase of the enlargement of the Århus Harbour.

1) The consumption of sand for beach nourishment at the West Coast of Jytland has shown a pronounced increase from 40.000 m³ in 1980 to more than 3,5 mio. m³ in 1998. The yearly consumption has been around 3 mio. m³/year for some years, but dropped to 1,8 mio. m³ in 2007.

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

A number of temporary dredging areas established in 1997 have been converted to permission areas by the end of 2006. The original 113 dredging areas have been reduced to 83 areas and more than 400 individual company permissions have been given.

In 2007 extraction permission has been granted in new 5 areas.

Since 2004 there has been an increase in the production of marine aggregates for concrete and construction due to current high activity in the construction industry. It is expected that week signs on a shortage of land based resources in some areas may increase the demand of marine aggregates.

3.3 Finland

There were no extractions in Finland in 2007.

Historic patterns of marine aggregate extraction (m^3)

EXTRACTION AREA	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL 1996-2007
Gulf of Finland	0	0	0	0	0	0	0	0	1,600,000	2,388,000	2,196,707	0	6,184,707

3.4 France

Marine aggregate (sand and gravel) extraction figures for 2006/2007

DREDGING AREA	AMOUNT *
Eastern Channel	932,000 m3
Brittany	338,000 m3
Atlantic Ocean	4,664,000 m3

*** Please insert units (e.g. m^3 or Tonnes)**

Description of aggregate extraction activities in 2006/2007

These quantities are based on the maximum quotas authorized by the French government.

Non-aggregate (e.g. shell, maerl, boulders etc) extraction figures for 2006/2007.

DREDGING AREA	MATERIAL	AMOUNT *
Brittany	Maerl	281,200 m3
Brittany	Shell	214,500 m3

*** Please insert units (e.g. m^3 or Tonnes).**

Description of non-aggregate extraction activities in 2006/2007

These quantities are based on the maximum quotas authorized by the French Government.

Exports of marine aggregate in 2006/2007

PORT (LANDING)	AMOUNT*
None	0

***Please insert units. Cubic metres are preferred. (e.g. m^3 or Tonnes and note conversion factor used)**

Marine aggregate exports in 2006/2007

France does not export marine aggregate.

Amount of material extracted for beach replenishment projects in 2006/2007.

DREDGING AREA	MATERIAL	AMOUNT *
Atlantic coast	Siliceous sand and gravel	225000 m^3

Description of beach replenishment schemes in 2006/2007

This material was extracted in 2004 for La Baule (Atlantic coast) beach replenishment. Since there sand extracted was not use as beach replenishment material.

Historic patterns of marine aggregate extraction

PERMIT NAME	DREDGING AREA	2000	2001	2002	2003	2004	2005	2006	TOTAL (BY PERMIT)
Le Pilier	Atlantic Ocean	2124326	2271760	2092038	2163848	2491514	2465909	2358107	15967502
Les Charpentiers		149851	199041	1500000	1500000	1500000	1500000	1500000	7848892
Sables d'Olonne		0	0	2349	0	3387	0	0	5736
Chassiron C		330000	330000	330000	330000	330000	330000	330000	2310000
Chassiron D		167000	167000	167000	167000	167000	167000	167000	1169000
Platin de Grave		117000	143000	174000	103000	400000	400000	400000	1737000
Graves-de-l'estuaire	Eastern Channel	330000	330000	330000	330000	330000	330000	330000	2310000
Graves-de-mer		157128	169465	146729	275500	141293	145118	200000	1235233
Griz Nez		64287	51266	36260	35746	39388	72000	72000	370947
Baie de Seine		0	0	0	0	0	330000	330000	660000
Golfe de Saint-Malo	Brittany	266000	266000	266000	266000	266000	266000	266000	1862000
Ilot Saint-Michel		69000	69000	69000	69000	69000	60000	76000	481000
Lost Pic		130000	130000	130000	130000	123000	123000	135000	901000
Phare de la Croix		13000	13000	11000	13000	13000	13000	11000	87000
La Horaine		76150	68600	86205	75450	76590	80000	80000	542995
La Cormorandière		17000	17500	19000	26000	30000	22500	21500	153500
Le Paon		5000	5000	5000	5000	5000	5000	5000	35000
Jaudy		15000	18580	9370	7500	7900	9200	11100	78650

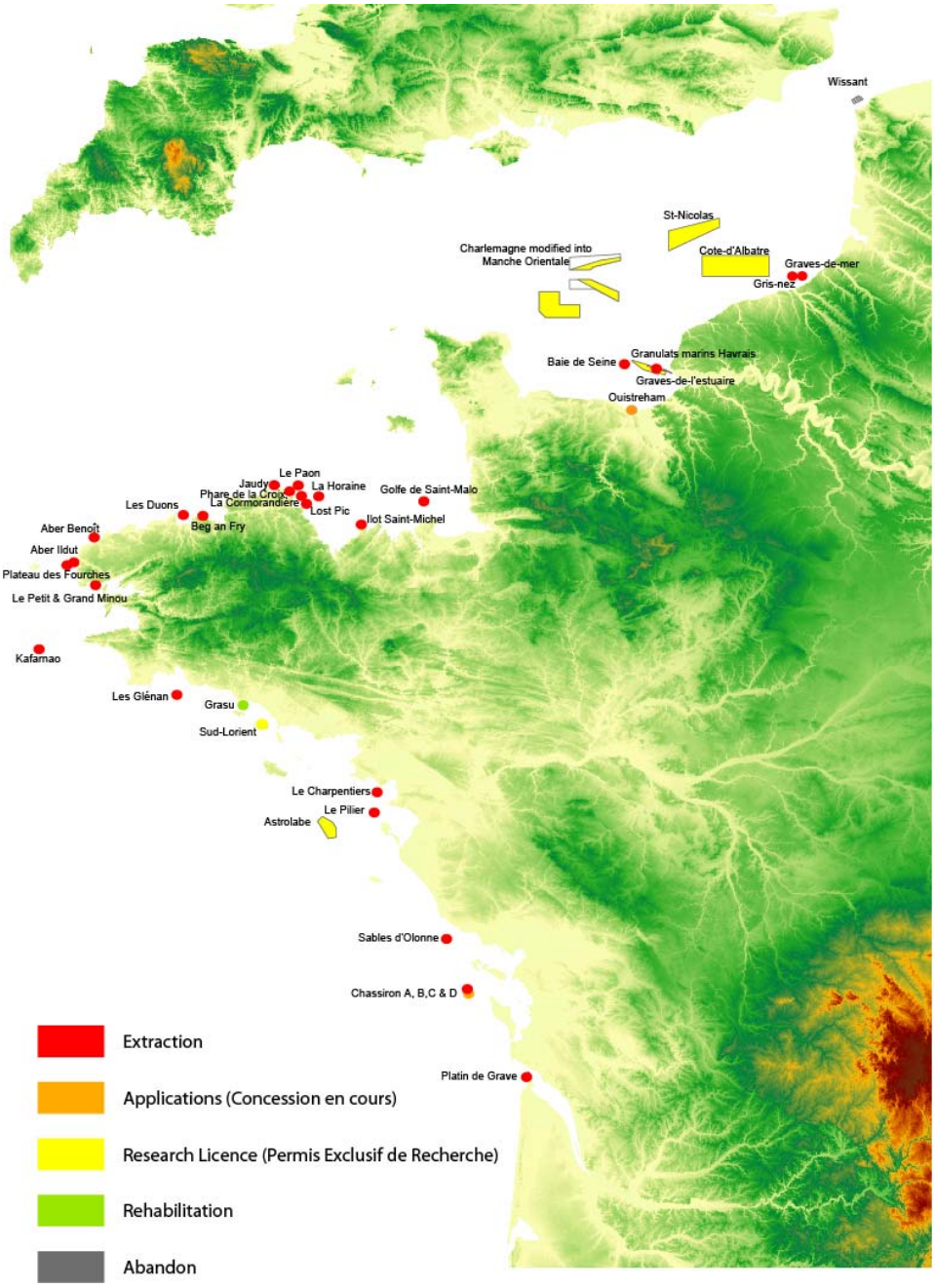
Beg an Fry	16500	16500	16500	16500	16500	16500	16500	115500
Les Duons	40000	40000	40000	40000	40000	40000	40000	280000
Le Petit Minou	33000	33000	33000	33000	33000	33000	33000	231000
Kafarnao	7700	12100	7300	8500	5249	20000	20000	80849
Les Pourceaux	6000	6000	6000	6000	6000	6000	6000	42000
Les Glénan	53195	53195	53195	53195	53195	53195	53195	372365
Aber Benoît	55000	55000	55000	55000	55000	55000	55000	385000
Aber Ildut	2000	2000	2000	2000	2000	2000	2000	14000
TOTAL PER YEAR	4244137	4467007	5586946	5711239	6204016	6544422	6518402	
In red maximum amount permitted by french government, Amount in m^3							**TOTAL 2000–2006:**	39276169

Description of historic extraction activities for 2000-2007

Quantities declarations are not available for all the sites and every year. Quotas are also used to complete this board. It gives an approximation of what is the maximum amount of marine aggregate extracted.

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

Four applications for aggregate extraction are being considered by French Government (MEDAD, Ministere de l`Environnement, du Developpement et de l`Amenagement Durable), 34 licences have been issued by MEDAD (28 extraction sites and 6 exploration sites) and one site is being rehabilitated.



Source: Ifremer

3.5 Germany

Values in 2007 reported by correspondence.

3.6 Ireland

No extraction in 2007.

3.7 The Netherlands

Table 3.7.1. Marine aggregate (sand) extraction figures for 2007

DREDGING AREA	AMOUNT Mm³
Euro-/Maas access-channel to Rotterdam	0,65
IJ-access-channel to Amsterdam	0
Dutch Continental Shelf	28,14
Total	28,79

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

Table 3.7.2. Non-aggregate (e.g. shell) extraction figures for 2007.

DREDGING AREA	MATERIAL	AMOUNT m³
Wadden Sea	Shells	85,943
Wadden Sea inlets	Shells	39,397
Western Scheldt	Shells	5,850
Voordelta of the North Sea	Shells	10,180
North Sea	Shells	101,910

Description of non-aggregate extraction activities in 2007:

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 2008. These permissible amounts (in m³) of shells to be extracted yearly from:

- the Wadden Sea max. 90,000
- (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 110,000 in 2005; 100,000 in 2006 and 90,000 in 2007
- the Voordelta 40,000
- the Western Scheldt 40,000
- the rest of the North Sea until a distance of 50 km offshore unlimited.

Table 3.7.3. Exports of marine aggregate in 2007.

DESTINATION/(LANDING)	AMOUNT (M3)*
Belgium	3,100,000
Luxembourg	12,000

*** Approximate figures.**

DREDGING AREA	MATERIAL	AMOUNT IN Mm^3
L17F (coast of Texel)	sand	2.301
M8C (coast of Ameland)	sand	1.730
Q2J (coast of Noord-Holland)	sand	6.151
Q2L (coast of Noord-Holland)	sand	1.176
Q13J (coast of Zuid-Holland)	sand	0.578
Q16C-2 (coast of Zuid Holland)	sand	0.857
Q16C-5 (coast of Zuid-Holland)	sand	0.866
S5E (coast of Zeeland)	sand	0.037
S5F (coast of Zeeland)	sand	1.487
Total	sand	15.185

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

Amount of material extracted for beach replenishment projects in 2007.

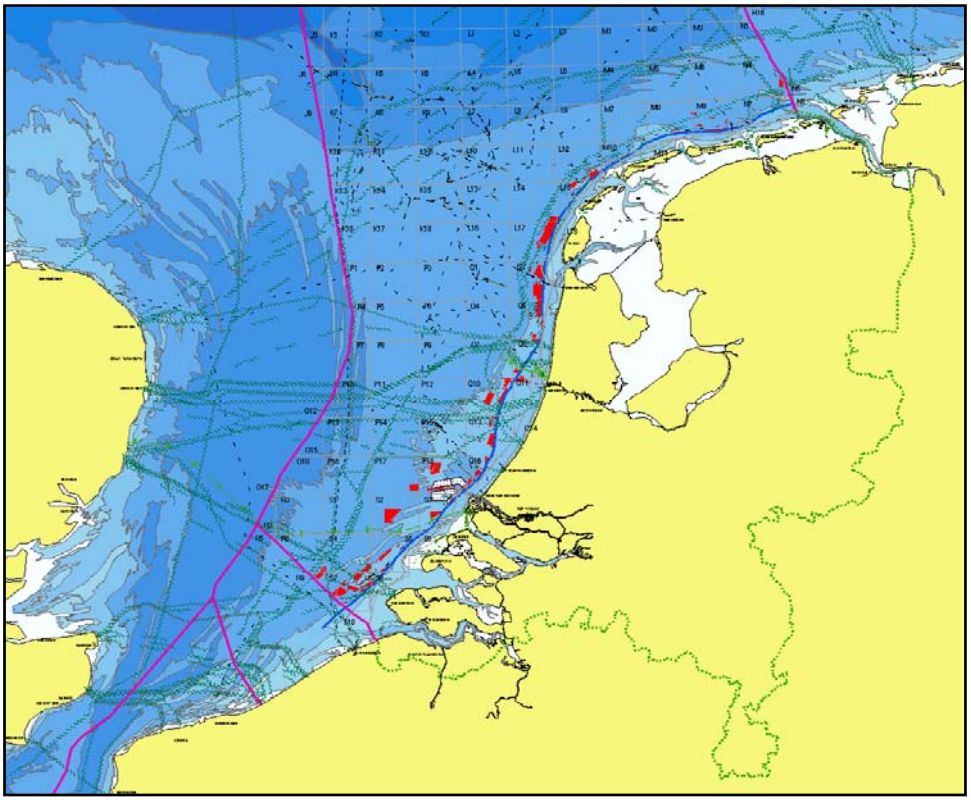


Figure 3.7.1. Licensed sand extraction areas march 2007.

Table3.7.4. Historic patterns of marine aggregate extraction in Mm^3.

EXTRACTION AREA	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL
Euro-/Maas channel	5,71	1,36	6,83	10,32	3,90	2,94	1,23	2,32	0,49	0,65	35,75
IJ-channel	6,33	5,06	4,78	2,31	1,41	0,87	1,06	4,31	0	0	26,13
Dutch Continental Shelf	10,46	15,99	13,82	23,81	28,53	20,07	21,31	22,13	22,88	28,25	207,25

Total extracted	**22,50**	**22,41**	**25,43**	**36,44**	**33,84**	**23,88**	**23,59**	**28,76**	**23,37**	**28,90**	**269,13**

Table 3.7.5. Dutch sand extraction 1974-2007

YEAR	TOTAL EXTRACTED M3
1974	2.787.962
1975	2.230.889
1976	1.902.409
1977	757.130
1978	3.353.468
1979	2.709.703
1980	2.864.907
1981	2.372.337
1982	1.456.748
1983	2.252.118
1984	2.666.949
1985	2.724.057
1986	1.955.491
1987	4.346.131
1988	6.954.216
1989	8.426.896
1990	13.356.764
1991	12.769.685
1992	14.795.025
1993	13.019.441
1994	13.554.273
1995	16.832.471
1996	23.149.633
1997	22.751.152
1998	22.506.588
1999	22.396.786
2000	25.419.842
2001	36.445.624
2002	33.834.478
2003	23.887.937
2004	23.589.846
2005	28.757.673
2006	23.366.410
2007	28.301.385

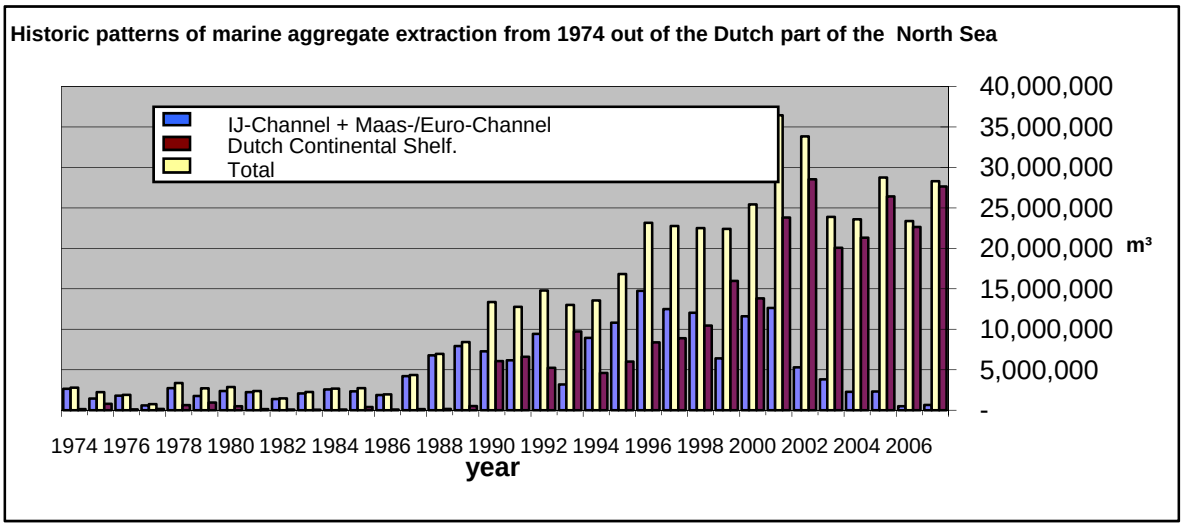


Figure 3.7.2. Historic patterns of marine aggregate extraction in the Netherlands.

Table 3.7.6 licences considered and issued licences Rijkswaterstaat North Sea.

IN THE YEAR:	AMOUNT
1998	35
1999	30
2000	25
2001	25
2002	42
2003	26
2004	20
2005	33
2006	33
2007	24

Table 3.7.7 Licensed area and actual areas over which extraction occurs.

COUNTRY	LICENSED AREA	AREA IN WHICH EXTRACTION ACTIVITIES OCCUR	AREA IN WHICH OVER 90% OF EXTRACTED MATERIAL IS TAKEN
The Netherlands (data 2007)	456 km²	38 km²	9.2 km²

3.8 Spain

In 2007 the only marine sediment extraction activity in Spanish Atlantic waters took place in La Coruna (Galicia Autonomous Community), with a total amount of 26,906 m^3 of sand extracted. This sand was destined for the replenishment of the Santa Cristina Beach.

The surface of the exploited area was 42,670 m^2 centred in the point with coordinates 43.3309º N; 8.3724º W.

The average thickness of the extraction was 0.29 m.

The total amount of the extracted sands was disposed in the Santa Cristina Beach. Beach nourishment is the only use permitted in Spain for sand extracted from marine deposits.

The following table includes the total marine sediment extractions in the Atlantic Spanish waters from 1990 up to 2007.

VOLUME (M^3) OF MARINE SEDIMENT EXTRACTION BY AUTONOMOUS COMMUNITY (1990-2007)

Year	Galicia	Asturias	Cantabria	Pais Vasco	Andalucia (Atlantic)*	Canarias	Total
1990	0	0	0	0	82,030	0	82,030
1991	0	0	0	0	663,797	0	663,797
1992	519,033	0	0	0	796,400	0	1,315,433
1993	1,049,733	0	0	0	861,658	274,785	2,186,176
1994	0	0	0	1,200,000	1,108,442	444,532	2,752,974
1995	0	130,000	21,000	0	210,834	54,000	415,834
1996	0	0	50,000	0	1,267,981	160,000	1,477,981
1997	0	0	0	50,000	1,617,668	0	1,667,668
1998	0	0	0	0	1,408,231	0	1,408,231
1999	0	0	0	42,000	450,000	0	492,000
2000	0	0	0	210,000	200,000	0	410,000
2001	0	0	83,295	215,000	0	0	298,295
2002	0	0	0	83,500	0	0	83,500
2003	460,000	0	0	275,000	456,016	0	1,191,016
2004	0	492,660	20,000	0	280,000	0	792,660
2005	0	48,662	0	0	0	0	48,662
2006	116,869	0	0	0	0	0	116,869
2007	26,906	0	0	0	0	0	26,906
Total	2,172,541	671,322	174,295	2,075,500	9,403,057	933,317	15,430,032

***Andalucia (Atlantic) includes the provinces of Huelva and Cadiz, located in the OSPAR area of this Community.**

Additionally, four different projects for beach nourishment have been carried out during 2007 using sand dredged inside harbours or navigational channels. The following table summarizes the main information on these projects.

BENEFICIAL USE OF DREDGE MATERIAL (2007)

Habour	Autonomous Community	Surface Dredged (m2)	Volume (m^3)	Replenished Beach
Mundaka	Pais Vasco	1,000	1,500	Laidatxu

Plentzia	Pais Vasco	40,000	62,811	Gorliz
Santander	Cantabria	100,000	25,100	La Magdalena
Sancti Petri	Andalucia	164,000	111,523	Sancti Petri & La Barrosa

According to the conclusions of OSPAR BDC 06, this kind of operation inside harbours is not to be considered as marine sediment exploitation, so these activities are not included in the table above.

3.9 Sweden

There has been no permitted marine extraction in Sweden since 1998. The last permission concerned the non-aggregate dredging of a new stretches for part of the Flint shipping channel between the Saltholm Island and the coast of Scania in connection with the building of the Oresund Link between Sweden and Denmark. All the material dredged was used for construction of an artificial islands south of the Saltholm Island at the Danish side of the Sound. The amount extracted within the Swedish EEZ was 2,500,000 m^3.

An application in 2007 to dredge 500,000 m^3 sand (for beach nourishment) during ten years at the bank of Sandhammaren off the coast of Scania, SW Baltic, was not permitted by the government, following the recommendations of the Geological Survey of Sweden and the Swedish EPA. The reason for the recommendation to the government was, partly that the municipality applied for extraction of sand in an area which would lead to an increase of the natural ongoing erosion of the beaches inside the bank, and partly because the beaches was set up as a Nature 2000 area.

An application from the Vattenfall AB company in 2005 to dredge 300 000 m^3 on Lillgrund in Öresund was permitted by the Geological Survey of Sweden. The purpose of the extraction is to even the bottom area at Lillgrund so a wind mill park can be established there. The sand and till was extracted during 2007 for fill in the Malmö Harbour.

Extraction of Marine Aggregate (m^3) in Sweden 1990–2007

Extraction Area	1990	1991	1992	1993–1997	1998	1999–2007	1990–2007
Disken							0
Sandflyttan	1,692	423					2,115
Vastra Haken	1,302	33,840	52,739				117,881
L. Middelgrund							0
S. Middelgrund	138,776	82,534					221,310
Faro							0
Oresund Link					2,500,000		2,500,000
Total	171,770	116,797	52,739	0	2,500,000	0	2,841,306

3.10 United Kingdom

Marine aggregate (sand and gravel) extraction figures for 2007 from The Crown Estate ownership

(Includes aggregate and material for beach replenishment and fill contract)

DREDGING AREA	AMOUNT (TONNES)
Humber	4,484,371
East Coast	7,715,428
Thames Estuary	977,027
East English Channel	1,961,035
South Coast	5,551,800
South West	1,769,197
North West	652,303
Rivers and Miscellaneous	109,399
TOTAL	1762,040

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

Contract Fill 0 tonnes

Beach Replenishment 2,098,514 tonnes

Non-aggregate (e.g. shell, maerl, boulders etc.) extraction figures for 2007

None during 2007 from The Crown Estate ownership.

Exports of marine aggregate in 2007 from The Crown Estate ownership

PORT (LANDING)	AMOUNT (TONNES)
Amsterdam	2,121,412
Antwerp	484,739
Brugge	604,838
Calais	114,030
Dunkirk	314,164
Fecamp	20,336
Flushing	1,108,102
Harlingen	449,815
Honfleur	87,430
Nieupoort	7,727
Ostend	586,784
Roscoff	10,875
Rotterdam	491,182
Zeebrugge	247,608
TOTAL	6,649,042

Amount of material extracted for beach replenishment projects in 2007 from The Crown Estate ownership

DREDGING AREA	AMOUNT (TONNES)
Bournemouth	765,141
Newbiggin-by-the-Sea	412,500
Pevensey Bay	33,816
Skegness (Lincshore)	887,057
TOTAL	2,0989,514

(Figures exclude beach replenishment and fill contracts)

Extraction Area	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Humber	1,903,678	2,351,233	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	34,615,364
East Coast	9,306,920	9,397,705	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	105,290,460
Thames Estuary	1,115,597	1,125,921	862,834	971,960	854,483	909,141	1,291,103	838,185	758,257	696,012	899,852	977,027	11,300,372
East English Channel	1,501,748	1,636,930	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	15,133,090
South Coast	3,236,653	3,096,895	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	51,049,053
South West	2,019,305	2,048,014	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	20,347,064
North West	287,251	284,497	275,590	355,044	316,090	421,068	482,270	470,962	558,398	611,983	608,314	652,303	5,323,770
Rivers & Misc	21,784	18,587	6,238	6,273	46,120	73,047	78,597	85,153	99,079	124,506	111,687	109,399	780,470
Yearly Total	19,392,936	19,959,782	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	21,122,046	243,839,643

Summary of current licence position and forecasts for future exploitation of marine aggregates (31/03/2008) within The Crown Estate ownership

TYPE	STATUS	NO.	AMOUNT (TONNES)
Licences	Extraction licences	80	168 million (proven primary reserve aggregate (i))
	Licence awaiting permission to commence	1	(ii) Not available
Applications	New applications	49	(ii) Not available
	Renewal applications	13	(ii) Not available
Prospecting	Prospecting licences (pre-application)	9	(ii) Not available

(i) Primary reserve in South West and North West is sand.

(ii) Tonnage not available due to a new standard method of measurement.

3.11 United States of America

Marine aggregate (sand and gravel) extraction figures for 2007.

DREDGING AREA	AMOUNT
New York Harbor	1.225 million m^3 (construction aggregate)
	1.712 million m^3 (cap material)

Description of aggregate extraction activities in 2006

Construction aggregate was recovered by Amboy Aggregates of South Amboy, New Jersey. They have held a license to dredge aggregates since 1985 from the Ambrose Channel, the entrance to New York Harbour. Amboy Aggregates is the only East coast aggregate producer to mine sand from the ocean floor. The company uses the *Sandy Hook,* a 7,500-ton capacity, trailing suction hopper dredge and is the largest supplier of aggregates to the New York City area. No other vessel of this type operates in the U.S. Mining operations are performed pursuant to permits granted to Amboy by the federal government and the states of New York and New Jersey. Sand is dredged from the outer reaches of the main shipping channel into New York Harbor (the Ambrose Channel), washed and mixed with crush stone, if needed, at a shore side facility.

In 2007, an additional 1.712 million m^3 mixed sand and clay was dredged from the Ambrose Channel as part of a larger project to deepen NY Harbor, which removed a total of 1.982 million m^3 in 2007, and from other navigation channels in New York Harbor. This material was used to cap an open-water disposal site, six miles offshore referred to as the HARS site.

Non-aggregate (e.g. shell, maerl, boulders, etc) extraction figures for 2007

DREDGING AREA	MATERIAL	AMOUNT
None	None	None

Exports of marine aggregate in 2007

PORT (LANDING)	AMOUNT*
None	None

Marine aggregate exports in 2007

Amount of material extracted for beach replenishment projects in 2007

DREDGING AREA	MATERIAL	AMOUNT *
Smith Point County Park, NY	sand	172,000 m^3
Surf City, NJ	sand	612,000 m^3
Cape May, NJ	sand	145,000 m^3
Bethany Beach, NJ	sand	est. 2.6 million m^3

Description of beach replenishment schemes in 2007.

The majority of beach dredging operations take place in State waters, within the 3-mile territorial jurisdiction, although that is changing as resources in State waters are being depleted. Beach nourishment is the preferred method of coastal protection in the U.S. mainly because it preserves the aesthetic and recreational values of protected beaches by replicating the protective characteristics of natural beach and dune systems.

The amounts tabulated above are for the north US Atlantic coast only (north of 38 degrees 27 minutes N, the starting point of the Mason-Dixon Line). Major renourishment projects continue in New York and south especially along the New Jersey shoreline.

Historic patterns of marine aggregate extraction in the NE Atlantic

Excluding beach nourishment (millions of cubic meters)

1990	0.2
1991	0.8
1992	0.8
1993	1.5
1994	1.7
1995	1.4
1996	c1.4
1997	c1.4
1998	c1.3
1999	1.3
2000	1.1

2001	1.3
2002	1.1
2003	1.4
2004	1.6
2005	1.4
2006	1.2
2007	1.2

3.12 Other countries

No reports were received from Canada, Estonia, Iceland, Latvia, Norway, Poland, Portugal and Russia.

Annex 4: Review of national seabed resource mapping programmes

4.1 Belgium

The Sand Fund of the Ministry of Economic Affairs in the framework of their monitoring program for sand and gravel extraction is producing maps of the extraction areas on a regular basis. In 2007 no new maps have been published. The Sand Fund is working on new maps for exploration sector 4 (see map) since in that zone a new extraction area has to be defined in the coming years. They are working with multi beam.

4.2 Denmark

Developments in marine resource mapping

Organisation(s) undertaking seabed mapping programmes:

Geological Survey of Denmark and Greenland (GEUS)

Scope of seabed mapping programmes being undertaken in 2007

Limited mapping activities in the Baltic and the Kattegat area.

Future marine resource mapping programmes

No general resource mapping programmes are planned for 2008.

4.3 Finland

Developments in marine resource mapping

No new developments

Organisation(s) undertaking seabed mapping programmes:

Geological Survey of Finland (GTK)

Scope of seabed mapping programmes being undertaken in 2007

A study of marine geology by the Geological Survey of Finland (GTK) concerning late-Quaternary deposits on the seabed is being conducted using acoustic and seismic methods: echo sounders, single-channel seismic and side-scan sonar. Investigations are supplemented with seabed sampling and visual observations. The basic scope of the study is to acquire data on the distribution and thickness of various types of sediments and information on stratigraphy, mineralogy and geochemistry of the deposits. New methods of sounding and sampling as well as data processing and analyses of samples are also developed and tested.

The aim of the study is also to increase knowledge of the physical properties and the geochemical variations in seabed sediments induced by both nature and human activity. Also the demand of various practical and scientific needs arising in a surrounding community should be met.

In context of the EU project BALANCE (Baltic Sea Management – Nature Conservation and Sustainable Development of the Ecosystem through Spatial Planning), GTK combined the Marine Landscape maps from different bottom quality, depth, etc. datasets.

The Finnish Inventory Programme for the Underwater Marine Environment (VELMU) collects data on the diversity of underwater marine biotopes and species. The inventories are being conducted in the Archipelago Sea, the Quark area, the Gulf of Finland, the Bothnian Bay and the Bothnian Sea. VELMU is a cooperation programme between seven ministries (internal affairs, defence, education, communication, agriculture and forestry, trade and industry and environment) (http://www.ymparisto.fi/default.asp?contentid=210670&lan=fi&clan=en).

Some information on survey methods and data processing can be found from

http://en.gtk.fi/mapping/marine.html

Published seabed resource maps in 2007

In the year of 2007 about 600 km² was surveyed in the Bay of the Bothnian, in the Quark (northern part of Bothnian Sea) and in the Gulf of Finland. Geological seabed maps published 2007 covered about 500 km². The mapping situation is shown in the index map available in the address http://en.gtk.fi/mapping/marinemap.html.

Future marine resource mapping programmes

The annual goal of seabed survey is 500-700 km². Main focus is on coastal areas, the goal is 70 % coverage in 2010.

4.4 France

Organisation(s) undertaking seabed mapping programmes: The French Ministry of Industry (Mineral Resource Directory) provided in 2004 a contract with IFREMER and BRGM (French Geological Institute for onshore) with a general objective to identify areas for sand and gravel extraction with minimal constraints for other end-users. Two large areas are explored during this contract: the Eastern English Channel and the part of the Atlantic coast located between the Loire and the Gironde estuaries, from the coast to the 50 m depth line. All information (compilation of present knowledge, no specific survey at sea needed) should be mapped and put in a global data base, into a GIS and also on a web site.

Three phases were planned during this contract:

- the first one is the inventory of mineral resources (finished in 2006);
- the second one is the "fisheries" one: inventory of fish resources (mainly of commercial interest) and mapping of fishing activity (finished in 2007);
- the third one is the collection of environmental data and various constraints (separation traffic zone, sub-marine cables, specific areas, etc.) and the final GIS; the expected end is 2008.

See the web site:
http:/ifremer.fr/drogm/Realisation/Miner/Sable/inventaire_des_ressources.htm

Scope of seabed mapping programmes being undertaken in 2006/2007.

No information.

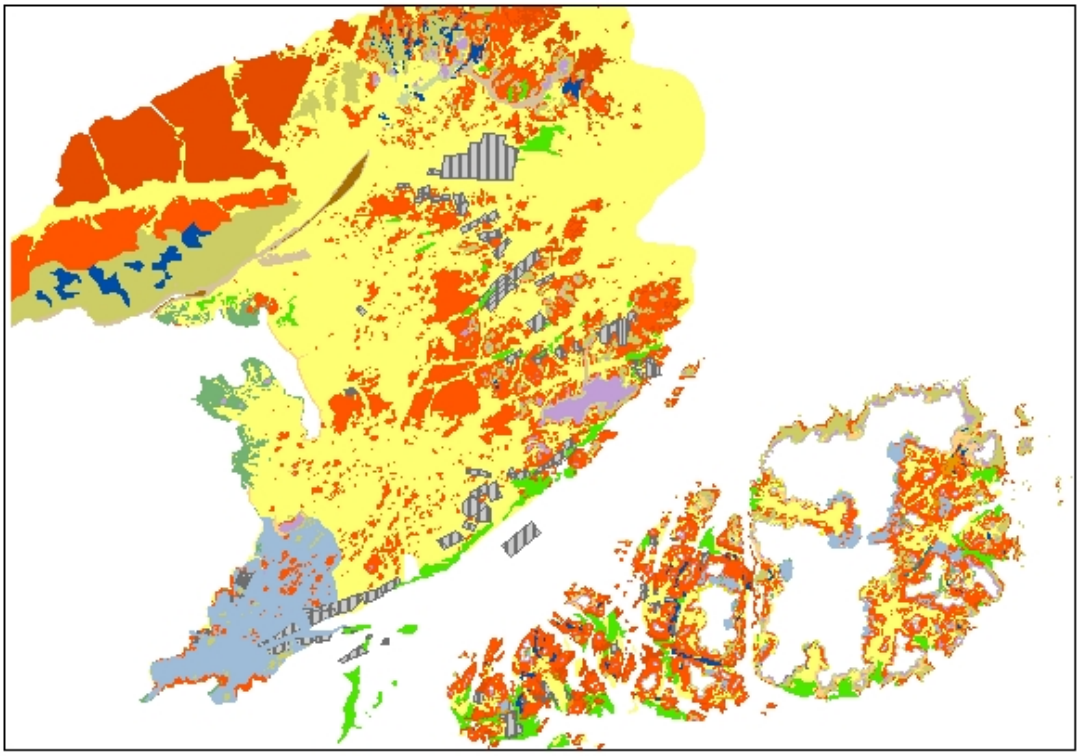
Published seabed resource maps in 2006/2007

- Map of surficial sedimentary formations of coastal environment from Paimpol to Saint-Malo, North Brittany (scale 1/50,000).

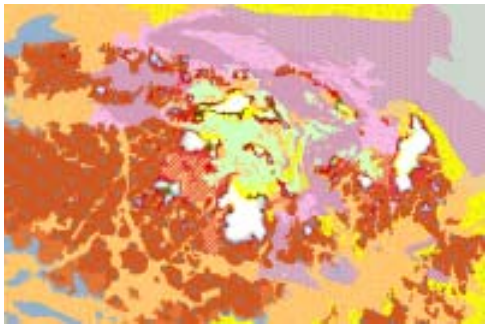
- Morphobathymetric map of Capbreton canyon, South West of France (scale 1/50,000).

For the following habitats maps, see web-site: http:// www.rebent.org

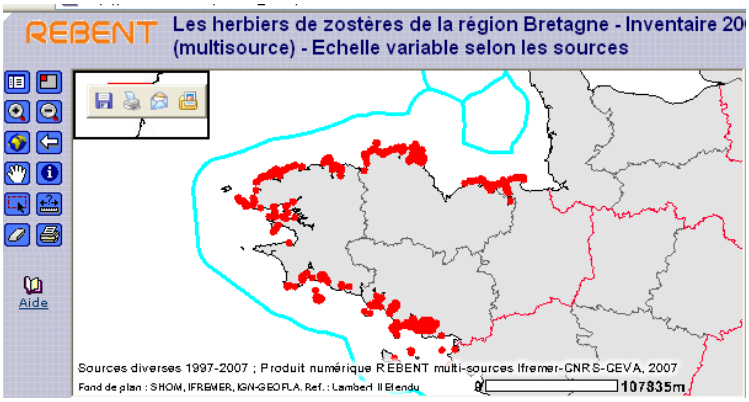
- Carte des habitats benthiques du secteur de Saint-Brieuc (multisource Rebent, 2006)
- Carte d'habitats benthiques du secteur Trégor-Goëlo (Rebent, 2007) - Echelle : 1 / 5 000 à 1 / 25 000



- Carte des peuplements benthiques du secteur de Concarneau (Source A. Ehrhold, A. Blanchet, D. Hamon, 2007) - Echelle : 1 / 2 000 à 1 / 10 000
- Carte des habitats benthiques du secteur de l'Archipel des Glénan (multi-source Rebent - Natura 2000, 2006) - Echelle : 1 / 5 000 à 1 / 10 000



- Carte des habitats benthiques du secteur du Croisic (zone intertidale) (multisource Rebent, 2006) (to be published)
- Les herbiers de zostères de la région Bretagne - Inventaire 2007 des sites (multisource)



See the web site: http:/ifremer.fr/drogm/Realisation/carto/Plateau/index.html

Future marine resource mapping programmes

The Bay of Lannion (North Brittany) was investigated in 2005, 2006 and 2007 using seismic method (sparker), multibeam and echo sounder. Several maps will be published: seabed morpho-bathymetric, surficial sediment, bedrock morphobathymetric, sediment thickness and solid geology maps.

- Mapping of the French EEZ, both of continental France and the overseas territories is planned for the coming years. Around the mainland, several cruises devoted to EEZ exploration have been carried out and a set of six bathymetric charts at a scale of 1:250,000 is being produced in the Mediterranean Sea between mainland and Corsica.

Other information

Ifremer and SHOM (Hydrographic and oceanographic service of the French Navy) are working with the elaboration of a project of recognition of the French continental shelf (until the EEZ).

Two projects are relevant to mapping of marine habitats, fisheries resources and fishing activity in the English Channel:

CHARM I: Eastern Channel Habitat Atlas for Marine Resources Management (finished in 2006): area studied: from the south of the North Sea to Fecamp (Normandy); see the web site: www.charm.canterbury.ac.uk/atlas/page.htm

CHARM II (two years program; finishing on September 2008): same objectives than first phase but area extended to the whole Eastern English Channel and separate mapping of juveniles and adults fish species.

A CHARM III program is in preparation.

A new program is also in preparation: the "Défi Manche" ("Channel Challenge"; 4 years planned): the whole Channel will be concerned, different programs and thematics will be involved (habitats mapping, GIS, fishing activity, modelling, biology, environmental aspects, regulation, economy, etc.) with several European partners.

Mapping :

- Synthèse bathymétrique et imagerie acoustique. Zone économique exclusive (ZEE). Atlantique Nord-Est

Six cartes bathymétriques au 1/250 000 (A. Normand, J.P. Mazé), 2 cartes de réflectivité au 1/500 000 (E. Le Drézen), Notice "La marge Nord du golfe de Gascogne : connaissances générales et apport des nouvelles synthèses de données multifaisceaux" (R. Le Suavé, J.F. Bourillet, A. Coutelle)

Several habitats maps have been already published:

- Carte des habitats (typologie EUNIS) en Manche orientale (Source L. Cabioch, F. Gentil, R. Glaçon, C. Retière, 1978) - Echelle : 1 / 100 000 à 1 / 200 000.
- Cartes d'habitats (typologie EUNIS) en Manche occidentale (Sources L. Cabioch, C. Retière, F. Gentil, 1968 et 1979) - Echelle : 1 / 50 000 à 1 / 180 000.
- Carte des habitats (typologie EUNIS) de la côte landaise au large d'Arcachon (Source Y. Monbet, 1972) - Echelle : 1 / 300 000.
- Carte des peuplements macrobenthiques en Manche orientale (Source L. Cabioch, F. Gentil, R. Glaçon, C. Retière, 1978) - Echelle : 1 / 100 000 à 1 / 200 000.
- Peuplements benthiques en Manche orientale, de la baie de Somme au Pas-de-Calais, 1975 (source L. Cabioch, R. Glaçon, 1975) - Echelle : 1 / 150 000.
- Peuplements benthiques en Manche orientale, du Cap d'Antifer à la Baie de Somme, 1977 (source L. Cabioch, R. Glaçon, 1977) - Echelle : 1 / 150 000.
- Carte des peuplements macrobenthiques de la Baie de Seine et de la Manche centrale sud, 1976 (source F. Gentil, L. Cabioch, 1997) - Echelle : 1 / 117 000.
- Cartographie biomorphosédimentaire du golfe normano-breton, 1987 (source B. Guillaumont *et al*., 1987) - Echelle : 1 / 25 000.
- Peuplements benthiques du Golfe Normanno-Breton, 1979 (source C. Retière, 1979) - Echelle : 1 / 152 000.
- Peuplements benthiques en Manche occidentale (zone prélittorale), 1968 (source L. Cabioch, 1968) - Echelle : 1 / 180 000.
- Répartition des peuplements benthiques dans la région de Roscoff, 1968 (source L. Cabioch, 1968) - Echelle : 1 / 50 000.
- Carte de la végétation marine côtière, Secteur Aber Wrac'h - Aber Benoît (Source : J.-Y. Piriou, 1987) - Echelle : 1 / 20 000.
- Carte de la végétation autour de l'Archipel de Glénan (Source : P. Arzel, 1985) - Echelle : 1 / 10 000.
- Atlas des fonds meubles du plateau continental du golfe de Gascogne : cartes biosédimentaires [zone côtière], 1976 (source C. Chassé, M. Glémarec, 1976) - Echelle : 1 / 100 000.
- Atlas des fonds meubles du plateau continental du golfe de Gascogne : cartes biosédimentaires [zone du large], 1976 (source C. Chassé, M. Glémarec, 1976) - Echelle : 1 / 500 000.
- Carte des habitats des Pertuis charentais (Source : C. Hily, 1976) (à paraître).
- Carte des peuplements benthiques de la côte landaise au large d'Arcachon (Source Y. Monbet, 1972) - Echelle : 1 / 300 000.

Organisation(s) undertaking seabed mapping programmes:

- SHOM (Hydrographic and Oceanographic Service of the French Navy);
- Ifremer (French research institute for exploration and exploitation of the sea);
- French Universities.

Scope of seabed mapping programmes being undertaken in 2006/2007

No information.

Published seabed resource maps in 2006/2007

- Map of surperficial sedimentary formations of coastal environment from Paimpol to Saint-Malo, North Brittany (scale 1/50,000).
- Morphobathymetric map of Capbreton canyon, South West of France (scale 1/50,000).

Future marine resource mapping programmes (please provide details of any planned seabed resource mapping initiatives).

The Bay of Lannion (North Brittany) was investigated in 2005, 2006 and 2007 using seismic method (sparker), multibeam and echo sounder. Several maps will be published: seabed morpho-bathymetric, surperficial sediment, bedrock morphobathymetric, sediment thickness and solid geology maps.

Other information

(please add any further information which you would like to be included in this review).

Ifremer and SHOM (Hydrographic and oceanographic service of the French Navy) are working with the elaboration of a project of recognition of the French continental shelf (until the ZEE).

A number of proposals are in progress including the "Defi Manche".

4.5 Germany

No report available

4.6 Ireland

Organisation(s) undertaking seabed mapping programmes:

National Organisations:

Marine Institute and Geological Survey of Ireland.

Other Organisations:

The INFOMAR (Integrated Mapping for the Sustainable Development of Ireland's Marine Resource) – programme is now fully operational and has extended mapping work into the inshore zone around Ireland. It will be carried out as a strategic partnership by the Geological Survey of Ireland and the Marine Institute, and represents the second phase of the groundbreaking Irish National Seabed Survey (INSS). Key aspects of the INOMAR programme are:

Funded under the National Development Plan c.€4m p.a. (2006-2016), INFOMAR aims to map the remaining 13% of the Irish territorial seafloor, concentrating on specific areas of interest such as priority bays and areas of biological interest. Further detailed information can be obtained from (http://www.marine.ie/home/services/surveys/seabed/).

Overview

Background to the Irish National Seabed Survey is available at a dedicated website www.gsiseabed.ie, whilst a separate website www.infomar.ie presents details for INFOMAR. In June 2007 GSI launched a new Seabed Maps viewer. Also in June 2007 GSI launched a site from which INFOMAR offshore & GSI onshore digital data can be downloaded. For more information see news release 1 June 2007. Data is accessible via the Interactive Web Data Delivery System (IWDDS). A lecture presented to Engineers Ireland in February 2007, outlining the origin and work of the INFOMAR Programme, is available as a webcast at the link: http://einwwebcasts.blogspot.com/

Summary of 2007 Operations

INFOMAR operations for 2007 began in April with the commissioning of a new Vibrocorer as part of a work programme in Galway Bay and acquisition of 6m cores in selected sites throughout the bay. Hydrographic and geophysical surveying of the Biologically Sensitive Area to the north of the Dingle Peninsula was conducted in April and May onboard the R.V. Celtic Explorer. More than 3,200 km² of coverage was achieved in what is a designated Priority Area within the INFOMAR programme. The survey revealed hitherto undiscovered features, including a major glacial moraine over 15km long located 36km offshore and a large trough just 300-400 metres off the Dingle coast. Almost 200 sediment samples were collected from a series of ten defined seafloor regions for geochemistry, biology and particle size analysis.

In July the R.V. Celtic Voyager was used to carry out a multibeam, seismic and sidescan sonar of a Marine Derived Autogenic Carbonate site in the Kish Bank area, of the Irish Sea. The work was carried for the National Parks and Wildlife Service and the Petroleum Affairs Division of the Department of Communications, Energy and Natural Resources, as part of evaluation of a potential new marine Special Area of Conservation (SAC).

A multibeam survey of a prospective wavebuoy ocean energy site off Eagle Island, County Mayo was undertaken by the INFOMAR team in July. This site has subsequently been chosen as the preferred location for a future test site.

Galway Bay was the next stop for the R.V. Celtic Voyager in July and August. The survey achieved more than 550km² of coverage, from the Aran Islands in, an area that covers approximately 60% of the bay. It also confirmed the location of the Galway Bay Fault, a fault line in the North Sound running northwest to southeast, between Lettermullan/Gorumna Islands in west Connemara and the Aran Islands.

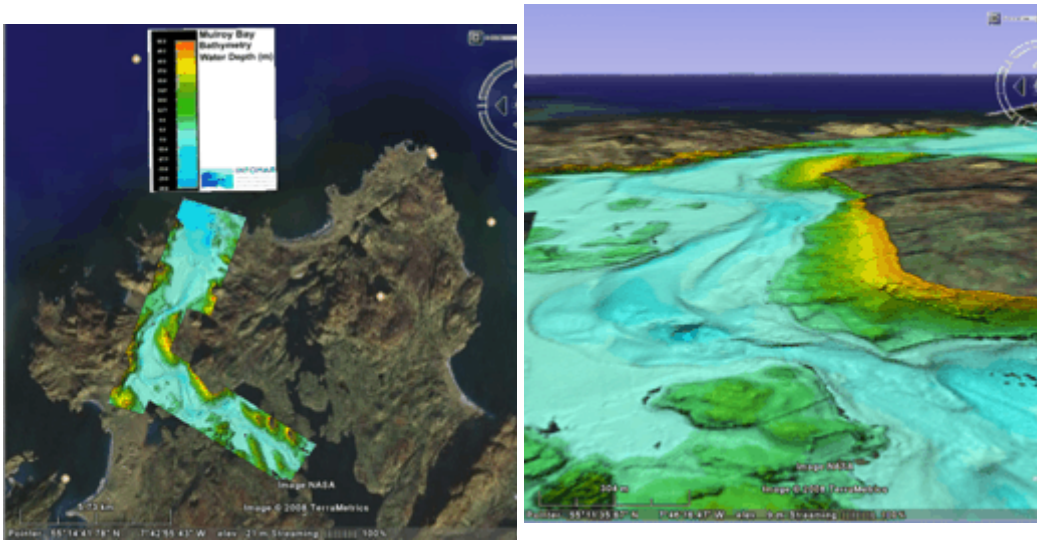
A cable route survey in Galway Bay for the proposed Smart Bay underwater observatory project was undertaken in tandem with the INFOMAR survey.

A coastal area offshore Waterford and Wexford, and the outer approaches to Waterford Harbour, an area totalling over 700 km² was surveyed in September and October onboard the R.V Celtic Voyager.

From here the offshore component of the INFOMAR programme will be moving on

to map areas of the Kish Bank off Dublin, Waterford Harbour, and continue work from 2006 in Bantry Bay and focus on Galway Bay.

2007 LIDAR Coverage



Core Samples

For the first time, the INFOMAR programme also collected 9 vibrocore samples of the sea floor in outer Galway Bay. Five of these cores are from an area where the National University of Ireland, Galway (NUIG) are investigating the effects of groundwater runoff from the Burren on sediment input and deposition rates of the Bay.

Future marine resource mapping programmes

Joint Irish Bathymetric Survey Project (JIBS) Project

The Maritime and Coastguard Agency is leading the Joint Irish Bathymetric Survey Project (JIBS), approved under the INTERREG IIIA Programme, with the Marine Institute of Ireland as project partner. The objective of the JIBS Project is to promote joint action to survey the seabed in such a way as to satisfy the needs of many organisations. The JIBS project commenced on 10 April 2007 and will completed by 30 June 2008.

Refer to INFOMAR programme above

Other information

A web-based GIS system containing information and outputs from the Irish Sea Marine Aggregates Project can be accessed at http://imagin.ucc.ie/.

4.7 Netherlands

The present mapping programme for the Dutch part of the North Sea covers the entire Netherlands EEZ and the territorial sea. The Netherlands Institute of Applied Geoscience and the Royal Dutch Navy, Hydrographic Office collect the data. The data comprise general and detailed digital bathymetric maps, side scan sonar images, cores and grab samples. Additional data are collected from the Ministry of Public

Work, Transport and Water Management and commercial companies. The maps are only available in digital formats or printouts.

The following maps are available:

- Bathymetry
- Seabed sediments
- Folk classification map
- Holocene formations at sea bed
- Thickness of the Holocene deposits
- Depth of the top of the Pleistocene

Lithostratigraphy of the top of the Pleistocene

4.8 Spain

Organisation(s) undertaking seabed mapping programmes:

AZTI for the Biodiversity Directorate of the Basque Government.

Scope of seabed mapping programmes being undertaken in 2007

399 km² of sublittoral area has been already mapped with multibeam sonar. This area corresponds to all the inner continental shelf of the Basque continental shelf between 5 and 50 m depth.

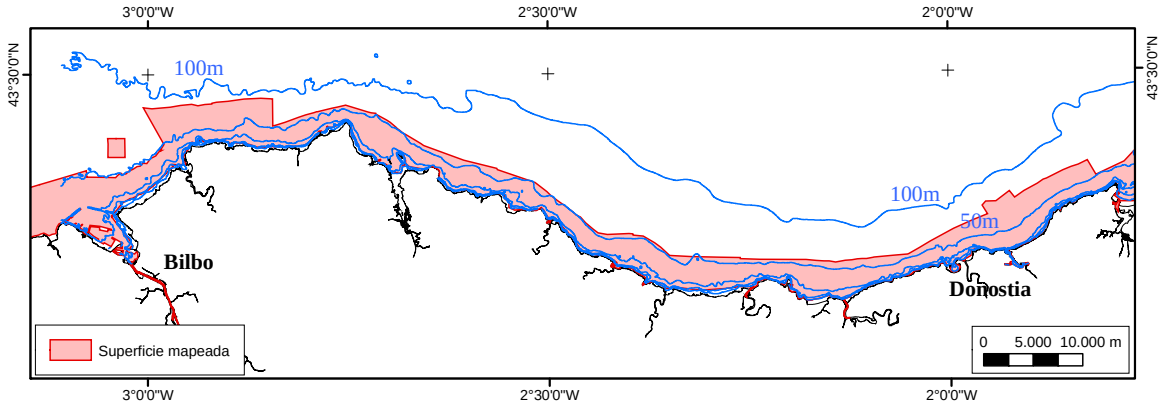


Figure 4.8.1 Image showing the progress by the end of 2007

The final product is 1 m resolution seafloor Digital terrain model integrated into a GIS environment.

Future marine resource mapping programmes

During 2008 the aim is to continue the surveys in order to reach 100 m depth.

Webmap Service: During last 6 years, Spanish Oceanographic Institute (IEO) has been gathering and synthesizing information published on the Spanish marine areas, incorporating it to a G.I.S.

In June of 2007 will be possible to have operative a Webmap Service with information (multisource) on bathymetry, sedimentary textural distribution, rock areas, artificial reefs, Marine Reserves, Marine Protec Areas (zones proposals by WWF), indicators of habitats, base lines and other informations that at this time are being defined. (The

URL will be notified when operative). Next objective it is to increase the fields of information and to development a Webmap Server.

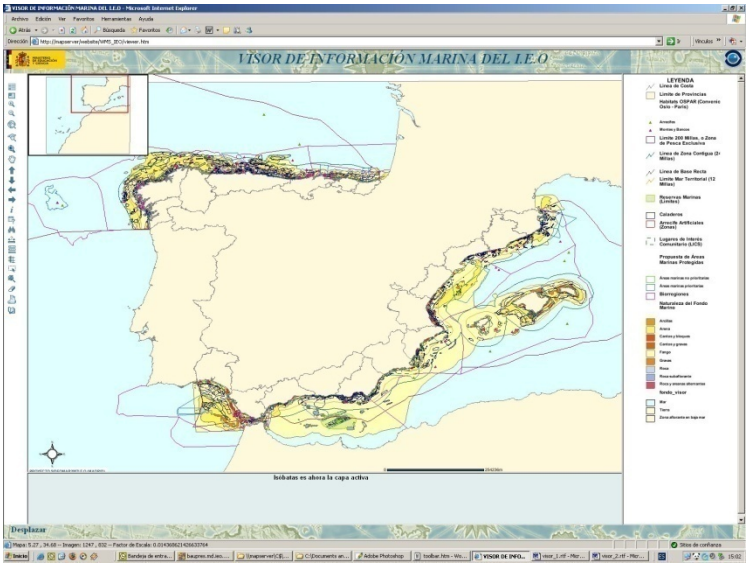


Figure 4.8.2: Screen of Webmap service of IEO.

4.9 Sweden

Marine geological mapping of the Swedish continental shelf area including the EEZ is the responsibility of the Geological Survey of Sweden (SGU). The Geological Survey is the national authority, under the auspices of the Ministry of Industry and Commerce, responsible for matters concerning Sweden`s geological character and the handling of minerals.

The mapping of the Swedish seabed started in a small scale in the early 1970's, but grew fast from 1989 and onwards. Up to the end of 2000 the mapping carried out was aimed for presentation in the scale 1:100,000, which meant measurements with full coverage of the sea-bottom with side-scan sonar and with the central line also covered simultaneously with sub-bottom profiler and shallow seismic. The geophysical surveys were followed up with ground-truth surveys (Figure 4.8.1). In addition to these surveys the superficial bottom sediments in specially selected deposition areas were sampled and analysed on c. 60 elements and c. 50 organic micropollutants. The geochemical database of the Swedish continental shelf (c. 80 000 analyses from c. 550 sites) forms the base of the adapted Swedish Environmental Quality Criteria of marine sediments.

According to the 1999-2006 mapping plan of SGU the investigations were oriented towards an overview mapping aimed for the scale 1:500,000. This type of mapping was carried out in mainly east-westerly corridors, 1 km wide, and spaced 10–12 km apart. The corridors run from the mainland all the way out to the outer border of the EEZ (Figure 4.8.1). The sea bottom in the corridors was mapped in the same way as the more detailed mapping mentioned above. In 2006, when the overview mapping was finished, the mapping program changed back to the first type of mapping aimed for presentation in the scale 1:100,000. The new mapping program will be carried out in all waters inside a boarder that runs parallel to and one nautical mile off the baseline.

In 2007 the new mapping program started with surveys in the northern Skagerrak coastal area of Sweden (Fig. 4.8.1). Part of this area is now established as the first Marine National Park in Sweden. A conversion/transformation of Swedish seabed map information into EUNIS nomenclature was also launched in 2007 and in the end of the year the BALANCE project, where SGU was one partner, was finished. Furthermore, in 2007 and based on survey data produced in 1993-1994, the map production started of the area south of Scania, southern Sweden (Figure 4.8.1).

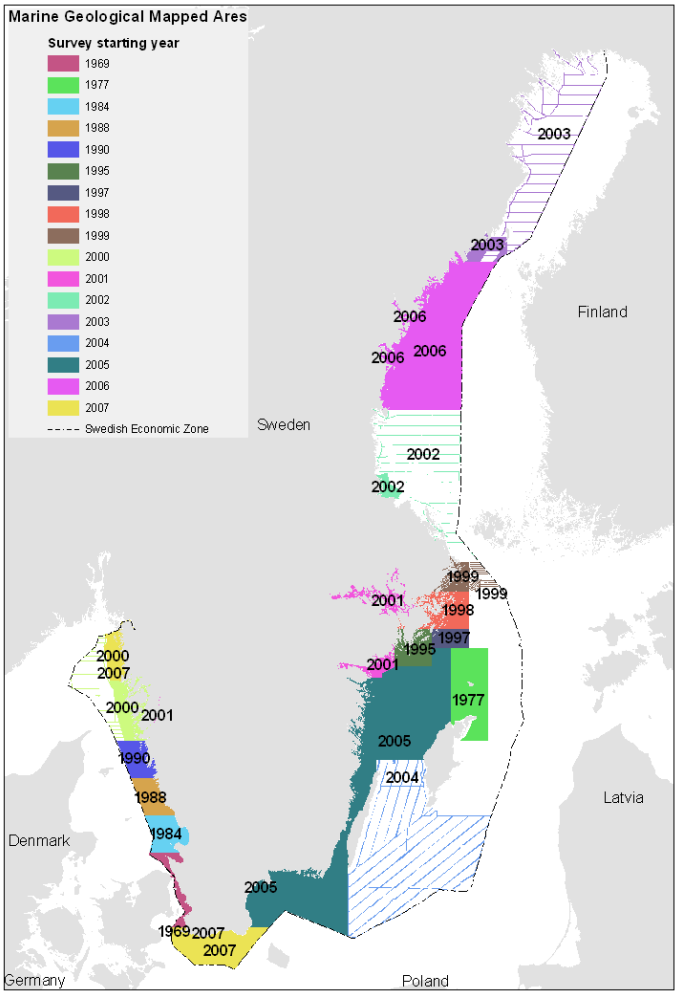


Figure 4.9.1. Mapped areas of the Swedish Continental Shelf that have been mapped regarding geology and geochemistry. The figures refer to the start years. The blue lines mark the corridors that were mapped in the overview mapping programme run between 1999 and 2006. In 2007 the northern Skagerrak coastal area of Sweden was mapped in the scale 1:100,000.

4.10 United Kingdom

At present, there are no co-ordinated national mapping programmes taking place on the UK continental shelf. A number of discrete habitat mapping programmes associated with aggregate extraction were completed and reported in 2007 as a result of stand-alone research initiatives, notably in the Outer Bristol Channel and in the East English Channel Region. The outputs of these programmes are available from www.marinealsf.org.uk.

Two Regional Environmental Characterisation data collection surveys were commissioned through the Marine Aggregate Levy Sustainability Fund (MALSF) to augment aggregate industry led Regional Environmental Assessments for the Thames Estuary and Isle of Wight regions and were undertaken during the summer / autumn 2007. Projects to interpret the data gathered in these surveys will be let during 2008. Additional habitat mapping programmes will be commissioned during 2008 to provide Regional Characterisation data for the Humber and East coast regions, which will again augment industry, led Regional Environmental Assessments.

Work was commissioned during early 2008 to generate digital regional bathymetric surfaces from existing hydrographic chart data. This will be used to help survey planning and data interpretation and the outputs available later in 2008

4.11 United States

GIS publications generated in 2007 by the U.S. Geological Survey Coastal and Marine Geology Program can be found at:

http://coastalmap.marine.usgs.gov/GISpubs/index.html

Continuing efforts between the U.S. Geological Survey and the Minerals Management Service can be found at:

http://geology.usgs.gov/connections/mms/landscapes/sand_gravel.htm

4.12 Other Countries

No reports were received from Canada, Estonia, Germany, Iceland, Latvia, Norway, Poland, Portugal or Russia.

Annex 5: Review of developments in national authorisation and administrative framework and procedures

5.1 Belgium

New legislation was already reported in previous reports and entered into force 1 September 2004. So, no new developments in the authorization and administrative framework and procedures are to be reported for 2007.

5.2 Denmark

New legislation affecting the regulation of marine aggregate extraction.

A change in The Raw Materials Act is expected in 2008 to fully implement the Habitats Directive.

Organisation(s) responsible for administering new legislation:

Ministry of the Environment, Agency for Spatial and Environmental Planning.

Changes to the management of marine aggregate extraction activities.

Organisation(s) responsible for administering new procedures:

Ministry of the Environment, Agency for Spatial and Environmental Planning.

Description of any new procedures

The general UAIS-system (Automatic Identification System) designed to provide information about the ship to other ships and to coastal authorities, is now used on a regular basis by the Agency to monitor dredging activities in Danish Waters. Information is displayed in MapInfo. Special applications have been developed to customize the system to the actual needs e.g. selection of vessels, monitoring periods and storing of historical information. A new procedure for applications for dredging permissions is also in preparation.

5.3Finland

New legislation affecting the regulation of marine aggregate extraction.

No new legislation in 2007

Organisation(s) responsible for administering new legislation:

Changes to the management of marine aggregate extraction activities.

No changes in 2007

Organisation(s) responsible for administering new procedures:

Description of any new procedures

5.4 France

The laws were changed in July 2006. There are no additive changes in 2007.

But because of reorganization of the french Government, in November 2007, the DIREM (Direction des Ressources Energétiques et Minérales), a sub-division of the

DGEMP (Direction Générale de l'Energie et des Matières Premières), which was in the MINEFI (Ministère de l'Economie, des Finances et de l'Industrie) is now under the authority of the MEDAD (Ministère de l'Environnement, du Développement et de l'Aménagement Durable).

See web site: www.industrie.gouv.fr/energie/matieres/f1e_mat.htm

5.5 Germany

No report.

5.6 Ireland

New legislation affecting the regulation of marine aggregate extraction.

No new legislation has yet been proposed however the competent authority (**Department of the Marine Communications and Natural Resources)** who are responsible for administering the current legislation that pertains to extraction of marine aggregates and other activities on the "foreshore" have recently sought (via the e-tenders website) responses from interested parties in relation to a formal review of existing legislation. The following is a summary of the call for tenders:

Title: Review of Foreshore Management Arrangements in Ireland

Published: 05/04/2007

Published by: Department of Communications, Marine & Natural Resources

Deadline: 17/05/2007

Full Text:
http://www.etenders.gov.ie/search/search_show.aspx?id=APR080915&ln=EN

To undertake a strategic review of the legislative framework, structures, and procedures in place to manage the State owned foreshore. The object of the Review is to outline the options, informed by best international practice, for putting in place a modernised legislative framework and improved systems and procedures for Coastal Zone Management, which will best fit the medium to long term requirements in this area.

Total quantity or scope:

The review shall be in the form of a report to the Minister for Communications, Marine and Natural Resources and will be a strategic review encompassing legal, marine planning/environmental and economic considerations.

In particular the review will:

- Identify and examine the current legislative and procedural arrangements for coastal zone management in Ireland
- Outline a Strategic Vision for improved Coastal Zone Management
- Review and recommend options for the development of
- a modernised legislative framework for Coastal Zone Management
- new and improved procedures and practices which will ensure improved Coastal Zone Management and improved customer service
- Indicate the resource requirements necessary to implement the various options outlined.

The Review should encompass but not be limited to:

- Legislative and other arrangements in place in selected EU Member States
- Legislative Provisions currently in force in Ireland
- Current Lease processing arrangements, including existing skills base and support structures
- The current valuation of foreshore leases
- Other related administrative structures
- Existing involvement of other public bodies (outside the Department) in the Coastal Zone Management process

Provide a project plan on the implementation of the proposed recommendation including the required steps to transition efficiently from the current structure and systems to the recommended.

5.7 The Netherlands

The effects of extraction on protected areas or protected species as defined in EU-directives are no longer covered by the Extraction Law, but by Nature Laws.

The extraction of sediments from waters under management of the national government is regulated by the 'Besluit Ontgrondingen Rijkswateren' (Decree Extraction in National Waters). This decree is in force from February 2008 onwards.

No change in content is made relating to the policy and regulations that are formulated in the Second Extraction Plan for the North Sea and the policy documents on shell extraction.

5.8 Spain

The laws were changed in 2006. There were no additional changes in 2007.

5.9 Sweden

In Sweden there have been no changes to the legislation concerning marine sediment extraction.

5.10 United Kingdom

The Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations 2007

and

The Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (Wales) Regulations 2007

Regulations were introduced by the Department of Communities and Local Government (formerly the Office of the Deputy Prime Minister) to bring marine aggregate extraction under statutory control in the England and Northern Ireland, and by the Welsh Assembly Government in Wales. The regulations are consistent with the requirements of the EIA and Habitats Directives, and compatible with Human Rights legislation. The regulations are accompanied by procedural guidance in "Marine Minerals Guidance Note 2" which supplements the existing "Marine Minerals Guidance Note 1". These documents contain procedural guidance explaining the applica-

tion process for marine minerals extraction in British waters together with guidance on environmental assessment, mitigation and monitoring criteria.

On introduction of the regulations in English waters, responsibility transferred to the Department for Environment, Food and Rural Affairs who use their Executive Agency, the Marine and Fisheries Agency to enact them on behalf of the Secretary of State. In Wales, the regulations are administered by the Welsh Assembly Government.

Further information on these regulations and the associated procedural guidance for England can be found at www.mfa.gov.uk and for Wales at www.wales.gov.uk.

5.11 United States

There has been no new legislation in 2007. As sand resources available in State waters for coastal and beach restoration and replenishment become scarce, the Federal Outer Continental Shelf (OCS) increasingly represents a viable source of material for beach restoration purposes. These resources are under the jurisdiction of the Minerals Management Service (MMS), a bureau within the U.S. Department of the Interior. To facilitate the leasing of these resources, Congress enacted Public Law 103-426 in October 1994, which amended the Outer Continental Shelf Land Act to provide the Secretary of the Interior with new authority to negotiate agreements and issue leases for the use of Federal sand, gravel, or shell resources for public works related projects. A summary of U.S. code for submerged lands can be found at: http://www4.law.cornell.edu/uscode/43/ch29.html

5.12 Other Countries

No reports were received from Canada, Estonia, Germany, Iceland, Latvia, Norway, Poland, Portugal, and Russia.

Annex 6: Review of approaches to environmental impact assessment and related environmental research

6.1 Belgium

No new EIA was made during 2007 since the integrated EIA which was made during 2006 can be used during 3 years and if new applications would arrive during that period the same EIA can be used.

New research

As reported in 2007, a new research program started officially at the 15th of December 2006 but the first kick-off meeting only took place in spring 2007. Hereafter follow the subject and objectives of this new research program which will run for 4 years. The promoter of the project is the University of Ghent (Dr. Vera Van Lancker) and several partners are associated with the study, e.g. the Management Unit of the North Sea Mathematical Models (MUMM). The first report is due for end 2008 and a report will be given at the next WGEXT meeting.

6.2 Denmark

No report received.

6.3 Finland

Date project commenced:

2004

Duration of project:

Organisation(s) undertaking research project:

Ramboll Finland Oy (former Paavo Ristola Oy)

Funding bodies:

Morenia, Metsähallitus

Description of research project

The environmental impact assessment has been completed for the Loviisa (eastern part of the Gulf of Finland) area (http://projektit.ramboll.fi/yva/morenia/loviisa-yva/YVA-selostus.pdf) and permission to extract 8 million m3 of marine sand was in 2007 accepted by the Environment Permit Authority. However there was a complaint against the decision and the case is now under hearing of Administrative Court of Vaasa.

Pori area, Bothnian Sea

Date project commenced: 2004

Duration of project:

Organisation(s) undertaking research project:

Ramboll Finland Oy (former Paavo Ristola Oy)

Funding bodies:

Morenia, Metsähallitus

Description of research project

The environmental impact assessment of the Pori (Bothnian Sea) area http://projektit.ramboll.fi/yva/morenia/pori-yva/YVA-ohjelma.pdf needed some further clarification especially on sediment studies, mapping of spawning grounds of fishes and monitoring of birdlife. The EIA has now been complemented and the planning of sand extraction and the permission procedure will be started during 2008.

Oulu-Haukipudas area, Bay of Bothnia

Date project commenced:

Duration of project:

2007–2008

Organisation(s) undertaking research project:

Ramboll Finland Oy (former Paavo Ristola Oy)

Funding bodies:

Morenia, Metsähallitus

Description of research project

Morenia, Metsähallitus has several years studied eight costal areas in the Bay of Bothnia: Vaasa, Kokkola, Lotaja, Kalajoki, Tauvo, Hailuoto, Haukipudas and Kemi. The aim of these studies is to enable the exploitation of the marine sand resources of these areas. All of these water areas are administrated by Metsähallitus (National Board of Forestry) and situate 10-30 km off the coast.

In June 2007 Morenia specified four of the above-mentioned areas more exactly and started EIAs. The areas under EIAs are Suurhiekka-Pitkämatala (Ii and Simo municipalities) , Merikallat (Hailuoto), Tauvo (Siikajoki and Raahe) and Yppäri (Pyhäjoki). The EIA procedures will be completed during 2008.

6.4 France

Date project commenced:

2006 (after initial phase in Dieppe from 2003 to 2007)

Duration of project:

5 years

Organisation(s) undertaking research project:

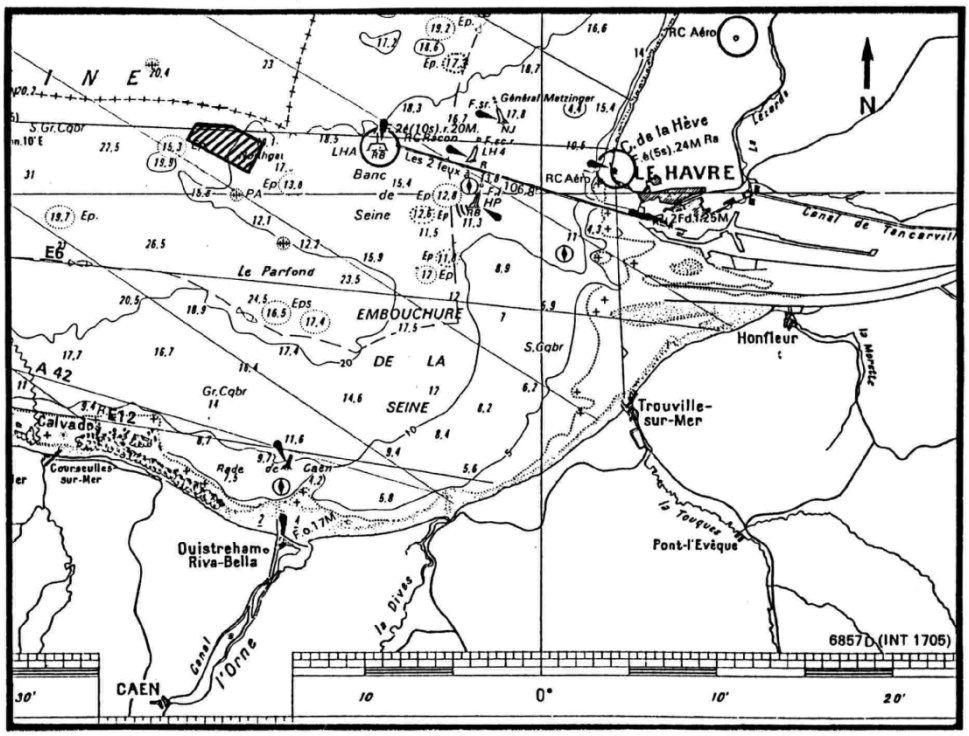
Group of Scientific Interest "Impacts of extraction of marine aggregates"

Funding bodies:

Ministry of Research, Regional Council of Haute-Normandie, dredging companies and national association + IFREMER & University of Rouen.

Description of research project

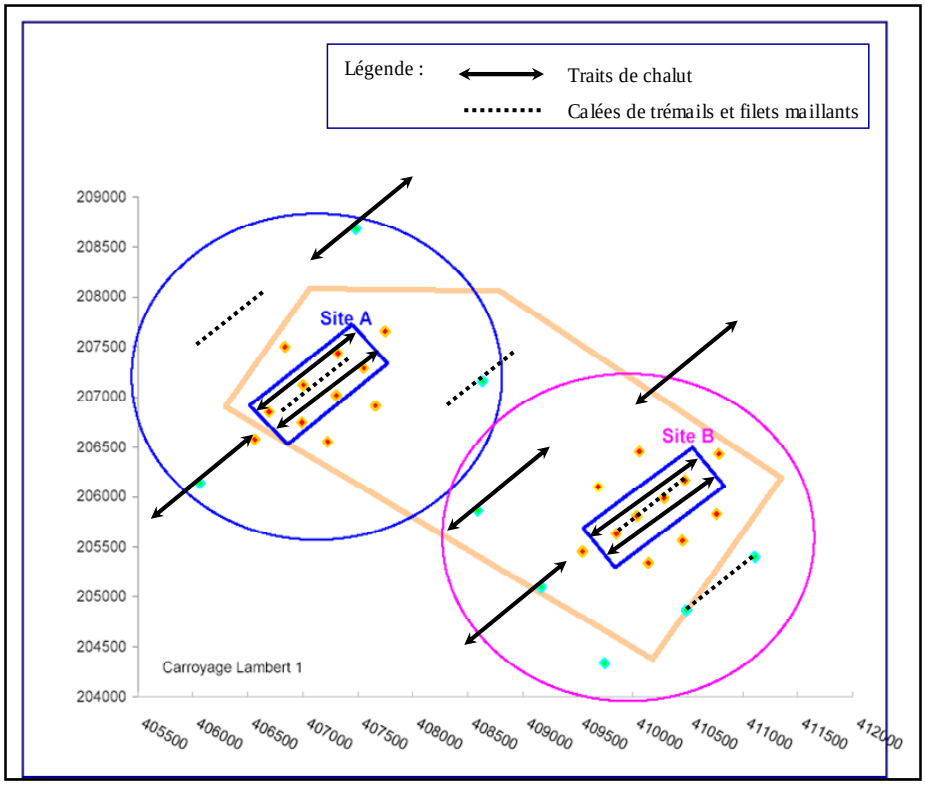
An experimental dredging area, located 12 miles offshore in Baie de Seine, will be exploited during a 4 year period.



In this area, two sites of 0.6 km² will be successively dredged with different intensities:

+ the site A will be dredged only during one year (2007–2008) to study the recolonisation rate of the local gravel community ; nivelling of grooves and ridges will be tested on one half of the first site to demonstrate the potential benefit of such a practice on the recolonisation rate by benthic macrofauna,

+ the site B will be dredged during three years (2008–2011) and will serve to study the spatial impact of pluriannual extraction activity.



Baseline survey of demersal fish communities (4 seasonal campains with trawling and fixed nets) was achieved in july 2007 and extraction activity could begin in November ; a time-table for the extraction was adopted with cessation of dredging activity in December and January and from July to September when fishing activity is the most intensive (scallops, sole, cuttlefish).

Baseline survey of benthic communities was done in February 2007 on site A (11 stations) and in February 2008 on site B (14 stations).

Monitoring of impacts will concern:

- the dispersion of the turbid plume (ADCP) and the analysis of the deposition area (site B) ;
- the seabed topography (multibeam), sediments and associated benthic communities;
- the demersal fish communities
- the trophic relationships between fish and benthos (analysis of stomach contents of selected species)
- the physical and biological restoration of the site A after cessation of dredging activity.

Preliminary results on trophic relationships show that cod is feeding on the same crab species in Baie de Seine (before any extraction activity) than on the site of Dieppe. In the absence of baseline survey, this species was thought to have adapted its diet to the local abundance of these opportunistic crabs recolonising fallow areas. Its abundance in the extraction site is only a consequence of the quality of this new feeding area resulting from dredging activity at a low intensity (< 1h/ha/year).

Dissemination of the results, both from Dieppe and Baie de Seine, is a priority of this new project to prevent misunderstanding from various stakeholders (fishermen, dredging companies, environmental associations.

This new experimentation has 2 main objectives:

- perform our knowledge on impacts of marine aggregate extraction activity in a different physical and technical environment than Dieppe (lower tidal currents, deepening of a flat gravely seabed instead of erosion of a shingle bank); will the effects on habitats, biodiversity, recolonisation rate, trophic relationships, presence and abundance of demersal fish species be the same as those observed in Dieppe, which need to be confirmed?
- evaluate the conditions for a potential development of marine aggregate extraction in the paleovalley of the River Seine.

Contribution to the knowledge of "the Impact of the marine material exploitation on the stability of the littoral" (publication 2008): synthesis of knowledge and the experiments on numerical modelling.

Date project commenced:

1999

Duration of project:

8 years

Organisation(s) undertaking research project: Ifremer

Funding bodies: Ifremer

6.5 Germany

No report.

6.6 Ireland

6.7 The Netherlands

The general procedure for Environmental Impact Assessments (EIA) in the Netherlands is described in the annual report of last year.

Actual EIA's

In the Netherlands 2 Environmental Impact Assessments for marine sand extraction are in procedure. In both EIA the alternative to extraxt to a depth of 6 metres below the sea bed instead of the regular 2 metres is studied as an environmental friendly alternative. The conclusion is that an extraction depth of 6 mertres gives a decrease in direct diruption of benthic fauna and no increase in other (negative) effects.

EIA for extraction of marine sand for coastal nourishment for the years 2008–2012.

EIA for extraction of marine sand for commercial use as fill sand on land and for industrial use for the years 2008-2017

This EIA is made by a Union of several commercial extractors. The initiative is aimed at an extraction of a maximum of 250 million cubic meters in a period of ten years. The extraction will take place in the vicinity of harbours. For the moment an extraction of 15 million cubic meters per year is expected. The EIA is published in April 2008 for public consultation till the end of May 2008.

Large scale sand extraction for the landreclamation Maasvlakte 2, an enlargement of Rotterdam harbour.

The procedure of public consultation and formal advice of the EIA for the sand extraction for the enlargement of the harbour of Rotterdam is concluded. The results are used for formulating of the conditions in the license that subscribe in which way the extraction can take place. See www.maasvlakte2.com for the EIA (in Dutch)

Licenses from the Extraction Law and Nature Laws will be given in May 2008 to extract a maximum of 365 million cubic meters of sand in an area at about 15 km off Hook of Holland. The start of the work is planned for atumn 2008. During a period of 2-4 years the first 80% of the sand will be extracted. The remaining 20% will be taken in the years between 2013 and 2033.

The sand will be extracted in an area outside the 20 meter depth contour. Moreover, when the sand is extracted from areas where the seabed contains little mud, the effects on the ecology of the coastal zone, like primary production, eye catching fishes and birds and benthic fauna and the fauna that predate on them, are minimized. Therefore, areas that contain to much mud or even clay layers are excluded from extraction. The extraction must be executed in such a way that most of the overflow of the hopper dredgers is deposited in the extraction pit itself.

The direct elimination of benthic fauna can be decreased by the construction of extraction pits deeper than the usual two metres below the seabed. A larger extraction depth leads to a lesser area to be disrupted by the hopper dredgers. Extraction pits will have a mean depth of 10 metres, although local maxima of 20 metres are allowed. The total area for extraction of marine sand will be restricted to 60 km^2.

By a design of the pit with a slope no steeper than 7 degrees the oxygen rich sea water will reach the bottom of the pit. The benthic fauna can recolonize in several years.

Negative effects on the coastal defence are not expected from an extraction so far from the coast.

To evaluate the effects predicted by the EIA an extensive monitoring programme will be executed. For details see Annex VII.

Cumulative effects

The monitoring required by the above mentioned licences will provide a large amount of data on the effects of large scale sand extractions in the coming years. Efforts are being made to combine these monitoring programmes.

The Environmental Law requires an EIA for each marine sand extraction with areas of more than 5 km^2 or more than 10 million m^3 per license. These boundary conditions refer to a single extraction or more than one adjacent extraction. The term adjacent is not defined in the law. It clearly is meant to avoid that extractions are planned just below the boundary conditions to fence with the law. The term adjacent must be seen from a point of view of the total effects on the environment. A study is executed by the research institute Wageningen IMARES to define the term adjacent, both in

space and in time, to be able to decide whether two extractions are adjacent so that it is clear if an EIA has to be made or not.

There is a increasing demand from environmental organizations to pay more attention to the combined effects of all activities at sea. More than before cumulative effects have to be taken into account. However the EIA's state that the impact of fisheries is 500 to 2000 times large than that of sand extraction, which makes it difficult to know exactly the effects of sand extraction.

Ongoing research

Title:

Mapping the shallow sandy coast.

Date project commenced:

May 2007

Duration of project:

8 months

Organisation(s) undertaking research project:

IMARES

Funding bodies:

Rijkswaterstaat, Institute for Coastal Zone Management/RIKZ, The Netherlands.

Description of research project

The increasing pressure on the shallow water environment stresses the need of understanding this ecosystem, enabling management aimed at preserving both its ecological function as well as coastal safety. Rijkswaterstaat funded a study aimed at describing the ecology of the shallow foreshore at two coastal regions in the Netherlands.

The interspecific zonation in the surf zone, transition and outer turbulent zone was described for the central Dutch coast at Egmond.and the coastal zone of the Wadden Sea Islands Schiermonnikoog and Ameland. The selection of sampling locations for ground truthing was based on morphological data and on the acoustic images of prior side scan sonar data and measurements with the Medusa system.

Parallels were observed between Ameland, Schiermonnikoog and Egmond regarding the geomorphology and benthos community. In the areas a system of breaker banks parallel to the coast exists. At all sites the macrofauna community in the shallow zone differs from the benthos community in the deeper zone. The composition (species richness and abundance) of the macrobenthos showed differences clearly related to geomorphological gradients such as the presence of breaker banks, troughs and sediment composition. Especially the rich benthic community on the slopes of the outer breaker bar and the hot spots of diversity in the troughs between the breaker bars are most vulnerable to the common nourishment technique used in the Netherlands to protect the coast.

The study demonstrates that the present assumption of ecological homogeneity of the shallow coastal zone with respect to the distribution of macrofauna as it is considered now under the WFD Annex 1 Habitat 1110 "Sandbanks which are slightly covered by

sea water all the time" is debatable. In the shallow coastal zone of the Netherlands different habitats can be recognized. On a local scale habitats are related to the geomorphology of crests, troughs and slopes of the breaker bank system. Also differences exist in the breaker bank zone of the coast of Wadden islands and that of the West coast.

The findings of this study can contribute to the development of an integrated coastal zone management', in which the protection of the land using nourishment and the protection of the marine environment are combined.

Report: Van Dalfsen, J.A. (2007). Inventarisatie brandingszone. Wageningen IMARES Rapport C138/07 (in Dutch)

Approaches to environmental impact assessment of the effects of marine sediment extraction

Title:

Monitoring coastal nourishment areas

Date project commenced:

June 2007

Duration of project:

10 months

Organisation(s) undertaking research project:

IMARES

Funding bodies:

Rijkswaterstaat, Institute for Coastal Zone Management/RIKZ, the Netherlands.

Description of research project

Preliminary to foreshore nourishments baseline descriptions of the macrobenthos community were made in four nourishment areas in the central coastal zone of the Netherlands (Petten, Bloemendaal, Zandvoort and a sandbank "Bollen van Kijkduin". The proposed nourishment areas are located on the seaward slope of the outer breaker banks running parallel to the coastline. The areas are all located in the central coastal zone where regularly nourishments are conducted due to increasing erosion of the coastline. Goals of the study were:

to describe the possible presence of high abundances (banks) of three target species; the bivalve species Spisula subtruncata and Ensis spec (Razor clam) being important staple food for birds, and the Sand mason Lanice conchilega, that might have a stabilising function to the sediment and may play a role as habitat structuring organism.

Samples of the seabed were taken with a 0.1 m^2 Van Veen grab for grain size analysis and macrofauna composition. At the locations Petten and Bloemendaal also side scan sonar imaging was used. The side scan sonar was tested as technique to detect concentrations of the target species Ensis and Lanice.

All areas can be characterized as having fine sandy sediment with a low content of silt and organic material. The benthos community is relative poor and can be characterized as a "Nephtys cirrosa- community. All three target species were found in the areas with low abundances (Ensis & Lanice) or not at all (Spisula).

For the Petten nourishment area also a reference area was defined and described. At this reference area no nourishment has taken place in the previous years.

De benthic community at the reference area was found to slightly deviate from that at the proposed nourishment areas, where in previous years also nourishments were carried out. This difference is explained by the presence of some species that were not found at any of the nourishment areas. Repeating nourishments might have an effect on the benthic community, although in general this highly dynamic environment recovers rather quickly after a disturbance.

Report: Van der Wal, J. T., and van Dalfsen, J. A. 2008. Monitoring Kustsuppleties. Wageningen IMARES Rapport Cx.xx.08 (Draft, In Dutch)

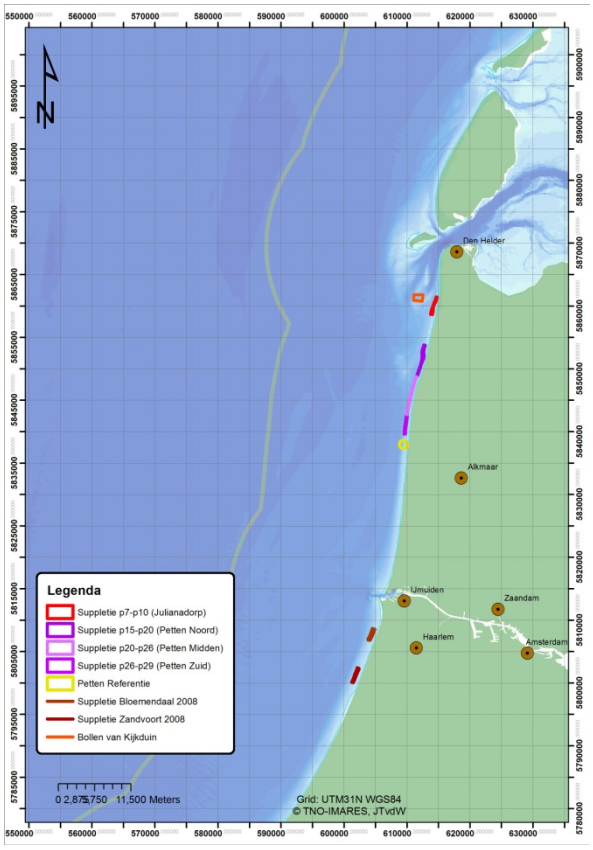


Figure 6.7.1. Location of the research areas North Holland coast

Future research

Title:

Building with Nature

Date project commenced:

2008

Duration of project:

5 years

Organisation(s) undertaking research project:

A consortium of Dutch marine contracting sector, scientific research organizations, universities, consultancies, industrial operators, two government agencies

Funding bodies:

Dutch Government and the consortium

Description of research project

Building with Nature is an initiative of Dutch industry, engineering consultants, specialist institutes and universities. It is an innovative, long-term research programme aimed at developing new design concepts for the layout and sustainable exploitation of river, coastal and delta areas. Its special feature is known as 'ecodynamic design': the synergy and cooperation that will allow natural ecosystems and human intervention to reinforce each other. The new design approach will lay emphasis on the opportunities an ecosystem offers, yet obviously without ignoring infrastructural and economic conditions. The research programme Building with Nature aims to provide objective, scientific knowledge and tools, technical and managerial, to help designers, builders and leaders develop areas in such a way that the economic and living environment evolves safely, prosperously and harmoniously in the long term.

It is a multi-disciplinary programme in which ecologists, scientists and technical specialists will work, design and create together, with nature as the starting point in the design process, to gain new knowledge on effectively developing and using ecosystems.

Four case studies are developed to test new knowledge in practical situations:

- Lake IJsselmeer and lake Markermeer: examples of new functions in a lake environment through human intervention
- Holland Coast: studying the concept of mega-nourishments as an attractive form of pro-active maintenance facing accelerated sea level rise, at the same time boosting nature and recreation.
- Southwest Delta: aimed at preserving and enhancing safety, economical and natural values in a complex and dynamic estuarine system.
- Singapore land reclamation: solutions for combining land reclamation with protection of both the coast and natural resources in a tropical environment.

To accommodate the programme EcoShape was set up by dredging companies Koninklijke Boskalis Westminster N.V. and Van Oord Dredging and Marine Contractors by its members including the representatives of the Dutch marine contracting sector, scientific research organizations, universities, consultancies, industrial operators two government agencies. There is a 26 million budget for a five-year period. More information can be found at **www.ecoshape.nl**.

6.8 Spain

A comprehensive report was filed in 2006; there was no new activity in 2007.

6.9 Sweden

As a first step to carry out the National Swedish Marine Environmental Strategy, the government gave a commission to the Swedish EPA and 14 marine related agencies in the end of 2005. A Swedish Marine Action Plan was produced in April 2006. In

this Action Plan, among other things, the need of a marine central body organisation was proposed so that individual management from different agencies can be better co-ordinated. A governmental committee has completed the details of the proposals, and it will be considered as a governmental proposition to the Parliament in 2008.

6.10 United Kingdom

Aggregate Levy Sustainability Fund

A significant amount of research was funded through the third round of the Aggregates Levy Sustainability Fund (ALSF), which came to an end in March 2007. A fourth round of one year funding commenced in April 2007 representing a total research budget of over £3 million. In total the Marine ALSF programme has supported over £12 million worth of projects focussing on marine mapping, assessment of environmental impacts, monitoring / mitigation associated with improving the way marine aggregate extraction is planned, assessed and managed.

A summary report was published in July 2007 detailing the current status of knowledge regarding the environmental impacts of marine aggregate extraction. This summary report was informed by a more detailed journal entitled "Marine Aggregates – Helping to Determine Best Practice" summarising the principle outputs from the projects funded through the MALSF.

A fifth round of ALSF is currently being consulted upon which suggests an additional £12 million of funds being potentially made available over the next 3 years. The Marine ALSF is guided by a steering group comprised of regulators, advisors and industry representatives. Further details on the fund, projects it has supported, the summary report and journal and its governance structures can be found at www.alsf-mepf.org.uk.

A metadatabase of project outputs for MALSF funded projects is available at www.marinealsf.org.uk

Regional Environmental Assessments

To support a forthcoming large number of licence and renewal applications, the UK marine aggregate industry have commissioned a series of Regional Environmental Assessments to address regional scale cumulative and in-combination issues. The first of the series cover the Isle of Wight and Thames Estuary regions and are planned to be finalised in late 2008 / early 2009. Work on the second phase of Regional Environmental Assessments will begin in 2008 for the East Coast region, with the Humber region to follow in 2009/10.

Guidelines on the production and conduct of the REA's have been produced by agencies involved in providing technical advice to the regulator (CEFAS, JNCC, Natural England and English Heritage). These guidelines are available from www.cefas.co.uk.

Once completed, the REA's will form a reference for the required site specific EIA's produced in support of each specific licence or renewal application. As stated above, the REA's will be augmented by REC's publicly funded through the ALSF.

Sustainable development data for the British Marine Aggregate Sector

The British marine aggregate industry published their first annual sustainable development report for the sector in 2007, through their industry trade association. The report builds on a sustainable development strategy published in 2006, which defined

a range of key performance indicators for the industry to report under the themes of economic growth, social progress, environmental protection and natural resources. Industry data for 84% of total marine aggregate production activity was collated for the year 2006, covering 24 of the 25 aggregate dredgers operated by members of the British Marine Aggregate Producers Association. Data included total production, hours spent dredging, kilometres steamed and fuel burned. This initiative has allowed the carbon cost of extracting and delivering British marine aggregates to be calculated – 7.796kg CO_2/tonne landed at the wharf.

The data contained in the first report defines a baseline position against which subsequent year's data can be compared, and the second annual report is expected to be published in the second half of 2008 covering the year 2007.

Both the annual report and the strategy document are available from www.bmapa.org.

Feeding into the industry's sustainable development initiative, a further report was published by the British Geological Survey, which examined the strategic importance of the British marine aggregate sector. This focuses upon the socio-economic contribution made the industry in supporting construction activity, coast protection schemes and exports. The report is available from www.bmapa.org.

6.11 United States

As a result of the study reported in 2007, the U.S. Minerals Management Service Guideline for obtaining offshore sand sources can be found at:

http://www.csc.noaa.gov/beachnourishement/html/human/law/borrow.htm

A continuing issue is the possible deflation of shoal features that may result in adverse changes in sand transport patterns, shoreline erosion, and accretion rates. In addition to possible adverse effects on the physical environment, subsequent habitat changes and effects on local biology could be encountered should the shoal morphology drastically be altered.

6.12 Other Countries

No reports were received from Canada, Estonia, Germany, Iceland, Latvia, Norway, Poland, Portugal, or Russia

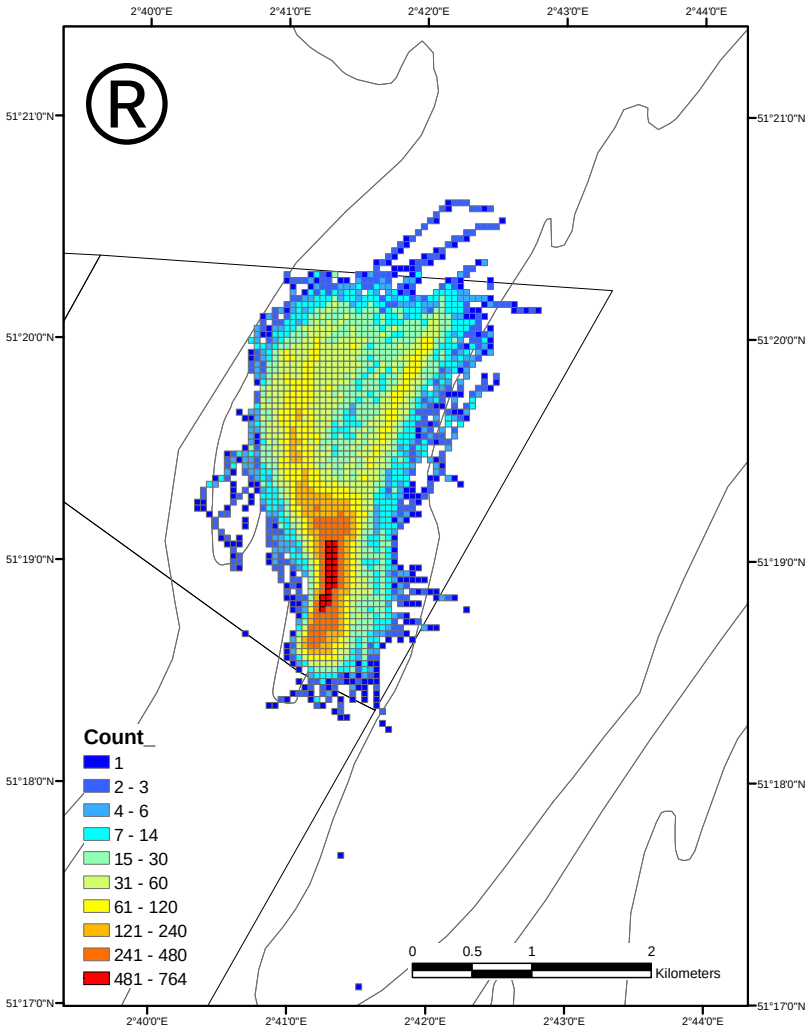
Annex 7: Detailed responses to ToR f) in relation to monitoring programmes carried out by members states

7.1. Belgium

Results of blackbox data. Black-box data are not only used as a control tool but are also very useful to see where most extraction is taking place so that the regulatory administrations can take measures when a certain area is being extracted too much and where a risk might appear of creating depressions in the sand banks.

Possible uses of black-box data:

- Calculation of the extracted amounts per vessel and per permit holder. This is being done by multiplying the vessel's capacity (and assuming vessels are loading their full capacity) with the total trips per vessel. These data are being used to make a comparison with the amounts were are reported in the official registers;
- Calculation of extracted quantities per zone and per permit holder;
- Use of the geographical position of the extraction vessels during extraction: each area is divided in zones of 50x50 m, then in each area it is checked how many positions with the code "dredging" are falling in this area. The number of "counts" was divided into 10 classes. An example of this exercise is given below;
- Calculation of mean time of extraction per vessel, total of trips and mean amount extracted per 30': e.g. in the period 2002–2006, 5 627 trips were registered and a total amount of 7 826 658 m^3 were extracted.



Intensity of extraction during 2006 in zone 2a.

General

Since marine sand and gravel extraction started in Belgium (1978), continuous monitoring has been carried out by the public sector itself. The monitoring is funded by the fees which concession holders have to pay per m³ extracted. The amount of the fee has changed over the years. Three departments are involved in the monitoring:

1) Fund for sand extractions of the Federal Public Service Economy

2) Management Unit of the North Sea Mathematical Models (MUMM) of the Belgian federal public planning service Science Policy

3) Flemish Institute for Agriculture and Fisheries Research (ILVO)

The following gives a short description of monitoring tasks carried out by the three departments

1. Fund for sand extractions

The Fund for Sand Extractions has responsibility for ensuring that the following types of research information are collected:

- a monthly statistical declaration by each concession holder;

- a "blackbox" registration system installed on board of each extraction vessel;
- a register filled in by the captain of the vessel during each extraction traject;
- a systematic mapping of the sea bottom;
- specific studies ordered at different universities on an ad hoc basis.

The first three means facilitate a thorough control of extraction activities and constitute a help when defining monitoring areas.

In order to be in a position to observe changes in the depth of the sea bottom caused by extraction, in 1999 a multibeam sonar was installed on board of the oceanographic vessel Belgica (funding costs for the multibeam was born by the Fund For Sand Extractions, installation costs and insurances were born by MUMM). Together with the continuous research monitoring of specific monitoring areas, this sonar is also used for systematic mapping of the sand banks. Before the installation of this multibeam, studies on sand banks were carried out by Ghent University by means of a single-beam sonar. These studies were funded by the Fund for Sand Extractions.

2. Management Unit of the North Sea Mathematical Models (MUMM)

As well as decoding the blackboxes, (carried out on behalf of the Fund for Sand Extractions), MUMM is active in studies concerning the dynamics of the suspended material and the sediment being disturbed by extraction. A series of models are under continuous developments, which are designed to take into account bathymetric variations, changes in the currents and the variations in sedimentation and erosion processes. These models are validated with all available data collected since the beginning of the monitoring operations.

These studies are attempting to determine the conditions for sustainable development and to distinguish between human impact and the natural variability (e.g. storms).

3. Institutes for Agriculture and Fisheries Research (ILVO)

The objective of the monitoring programme carried out by (ILVO) is defining the effects of sand extraction on:

- the biodiversity in and on the bottom;
- the physico-chemical composition of the sediment;
- the chemical contamination of sediments and biota;
- remobilisation of contaminants in sediment;
- the general health of organisms living in the sand extraction areas.

Long term data bases have been established to facilitate determining trends in various important parameters associated with each of these aspects.

The following new initiatives have come into operation since the change in legislation in (2004).

In order to improve the internal transparency, on a yearly basis all three departments are required to present both their work plans and their results to an Advisory Commission.

In order to improve the external transparency, the three departments are required to organise a workshop with all stakeholders on a 3-yearly basis. In addition in order to

work more in "real time", all partners are required to open a web site in which all these actions are presented as well as all new information, data, etc.

7.2 Denmark

7.3 Finland

Helsinki area, Gulf of Finland

Date project commenced:

2003

Duration of project:

4 years

Organisation(s) undertaking research project:

Vesi- ja kalatutkimus Oy, Alleco Ltd, Luode Consulting

Funding bodies:

Vuosaaren satamahanke, Port of Helsinki

Description of research project

The monitoring of the effects of construction and dredging work including marine sand extraction in the new Port of Helsinki has been monitored officially from 2003 when the construction work started. In 2006 the harbour works included dredging and filling of the harbour, soil dumping and sea sand extraction. Additionally, there has been some small scale contamination dredging in the harbour's second phase area.

In 2006 the monitoring included water and sediment sampling, turbidity surveying, water quality model applications, monitoring of solid matter in spill water originating from sea sand extraction, monitoring of zoobenthos (extension of soil dumping area), seabed vegetation surveys, monitoring of contaminants in Baltic clams and fish, monitoring of Baltic herring spawn, monitoring of fish fry, and monitoring of recreational and professional fishing.

Sand extraction

In 2006 a total of 778,000 m^3 of sea sand was extracted from Soratonttu between 11th August and 1st September, and from Itä- Tonttu 1,422,000 m^3 between 3 September and 5 October.

Monitoring

The impact of sea sand extraction was monitored by means of turbidity and sedimentation monitoring, algae transects, and a questionnaire addressed to professional fishermen. Additionally, the solid matter concentration in water pumped out of the "sand hopper" in connection with sand extraction was monitored through water samples.

Dispersal of turbidity

The sand extraction turbidity effect was monitored by boat with an automatic turbidity-measuring device. Additionally, the turbidity levels were measured with turbidity measuring loggers in the vicinity of the sand extraction area. No increasing

turbidity levels were observed in the surface layers of the water column. In sea sand extraction areas higher turbidity levels were observed in the bottom layer during extraction about 1.5 km from the extraction point. In measurements made during the extraction, turbidity in the water column was observed to rise to a height of 20 m from the seabed. Using constantly operating turbidity meters it was observed that turbidity increased during extraction in the Soratonttu area. However, the turbidity levels normalised within one week after the beginning of extraction. According to the turbidity loggers, the turbidity impact in Länsi-Tonttu remained low.

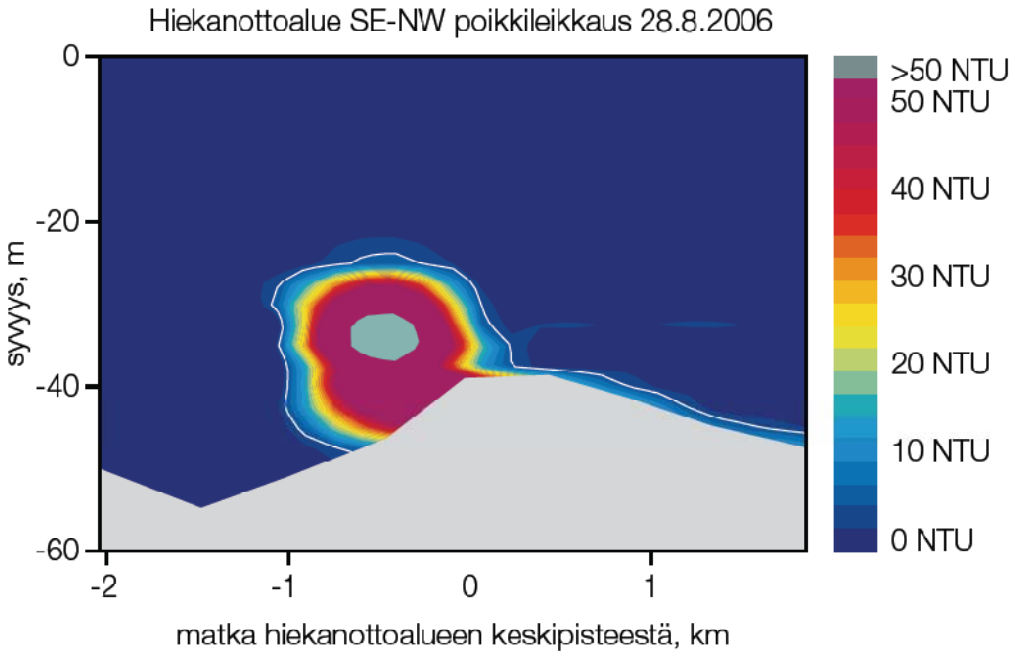


Figure 7.3.1. Turbidity in the SE-NW transect of Soratonttu sand extraction area after extraction work on 28 August 2006. Water depth from the surface is in metres and distances from extraction area in kilometres. Border of visible turbidity (10 NTU) is shown with white line.

Flushed solid particles in discharge water

According to calculations, a total of 110,785 tons of solid particles was flushed into the sea with discharge water during sea sand extraction.

Seabed vegetation along the diving transects

In the sea zone and Söderskär Natura area sand extraction was not found to have had any adverse effects on the vegetation of the sea bed. The changes in regard to both perennial and annual algae in both areas were in the main small and they most likely reflect normal annual fluctuations.

Fishery

According to the professional fishermen the sand extraction work has resulted in fish moving to other areas and the fishing gear becoming dirty. As a consequence, the fishermen have been forced to move to other fishing sites, causing them extra costs.

References

Vatanen, S., and Haikonen, A. (eds.) 2007: Vuosaaren satamahankkeen vesistö- ja kalatalousseuranta 2006. Vuosaaren satamahankkeen julkaisuja 1/2007, 120 p. ISSN 1795-1836 (printed), ISSN 1795-1844 (web publication). In Finnish and Swedish with English abstract and summary.

http://www.vuosaarensatama.fi/linked/fi/tiedotteet/Vesisto_Kala_2006.pdf.

7.4 France

1. Scope

Outline of processes (who, what, when, how, circumstances, conditions, stages, cost allocation models) employed in your country to establish the scope and detailed specifications for monitoring programmes e.g. with respect to the following headings:

a) types and conditions of monitoring: equipment, parameters to be measured, frequency of measurement : IFREMER recently updated his methodological recommendations for baseline and monitoring surveys (2006). Description is available at:

"www.ifremer.fr/drogm/Realisation/Miner/Sable/protocole.htm"

N.B: ICES recommendations have been used to perform this new protocol.

b) numbers of sampling points, spacing of sampling points, replicates, geographic spread : IFREMER web-site

c) reporting frequency (= monitoring frequency), format (?), requirement for publication : no information available

d) scope revision processes i.e. how is the scope of monitoring revised e.g. on a phased basis based on initial results? *if at all : no information available*

2. Implementation

IFREMER is officially mandated as expert to give his opinion to public decision-makers (Ministries of Industry and Environment, Prefecture) on the quality of licence inquiry documents.

Outline of implementation processes (who, what, when, under what circumstances, terms and conditions) employed in your country in relation to the implementation of monitoring programmes e.g. with respect to the following headings:

a) allocation of responsibility for implementing monitoring programmes e.g commissioning, undertaking by private companies and/or university laboratories, assessing results by the Regional Direction for Industry, Research and Environment (DRIRE), quality assurance (?) , establishing key parameter thresholds (tonnage, depth) ,

b) applying thresholds and deciding/enforcing actions based on degree or frequency of compliance/excedence

The Regional Direction for Industry, Research and Environment (DRIRE) assesses maximal annual tonnage and maximal dredging depth allowed

c) modification/revision of monitoring programme- responsibility for implementation of modifications (including cost allocation models).

DRIRE is asking that a new environmental impact study is undertaken if the company wants to increase the annual tonnage or maximal depth allowed.

Frequency of monitoring is increased in proportion to the annual extracted tonnage.

d) Storage and dissemination of results in short medium and long term.

DRIRE is controlling the results of each (1, 2, or 5 years) monitoring phase.

7.5 Germany

No report.

7.6 Ireland

7.7 The Netherlands

Monitoring for Maasvlakte 2, enlargement Rotterdam harbour

An elaborate survey was executed as a baseline description of benthic fauna, juvenile fish and suspended matter. In 2008, a second baseline will be carried for benthos n the area that was carried out in 2006. The position of the sample stations has changed as a result of the progress of insight in the possible effects of the activity.

Using the baseline studies already conducted as a starting point a monitoring programme is set up to determine the physical and ecological effects of the large scale sand extraction

The monitoring includes:

1) Location and activity of the hopper dredgers by an electronic system, e.g. black boxes.

2) The amount of extracted sand, measured in the hopper.

3) Grain size analysis of the sand, measured in the hopper.

4) Bathymetry of the extraction pit and the direct surroundings

During extraction, once per month. The first five years after extraction, once per year. Later every five years till the changes in the sea bed are stable or comparable with the natural sea bed.

5) Composition of the seabed.

Measuring of the sedimentological characteristics like grain size and mud content.

In the neighbourhood of the extraction pits, twice a year during extraction. After the extraction once per five years in the pit and the surroundings of the pit till the (changes in) composition are comparable with the natural seabed.

6) Suspended matter in the water column.

The concentration of suspended matter must be measured in the sand extraction area and in the area under influence of the extraction.

For these measurements a monitoring programme is worked out with a combination of satellite measurements and ship or buoy based measurements in a broad area along the Dutch coast.

7) Benthic fauna

Determining the species and biomass of the benthic fauna in and around surroundings of the extraction pit and in reference areas to control the recovery of the benthic fauna after extraction.

8) Measurements of underwater noise due to the activities of the hopper dredgers during extraction, transport and deposing of the sand.

These measurements are meant to check the worst case for effects on marine mammals as stated in the EIA.

9) Determining eventual change in time of the peak of algae blossoms and the effect of this on shellfishes.

The monitoring programme can be changed, after approval of the authorities, on basis of efficiency or meaningfulness of the measurements.

7.8 Spain.

1. Scope

Outline of processes (who, what, when, how, circumstances, conditions, stages, cost allocation models) employed in your country to establish the scope and detailed specifications for monitoring programmes e.g. with respect to the following headings:

a) types and conditions of monitoring: equipment, parameters to be measured, frequency of measurement,

Environmental aspect: Biological communities
Equipment: sediment bottoms, van Veen grab sampler; rocky bottoms: diving and towed video.
Parameters to be measured: diversity, richness y density
Frequency of measurement: preview status, 1 month after the works are completed, 6 months, 1 year y 2 years.

Environmental aspect: Fishing resources
Equipment: local fishing methods
Parameters to be measured: Resource biomass and annual captures
Frequency of measurement: preview status, 1 month after the works are completed, 6 months, 1 year y 2 years.

Environmental aspect: Water Quality Monitoring
Equipment: Multiparameter data sonde and hydrographical water sampler
Parameters to be measured: Tº, salinity, ORP, pH, Dissolved Oxygen, turbidity y Concentration of matter in suspension.

Frequency of measurement: preview status, 1 month after the works are completed, 6 months, 1 year y 2 years.
Environmental aspect: Sediments Quality Monitoring
Equipment: van Veen grab sampler; rocky bottoms: diving and towed video.
Parameters to be measured: granulometry, Organic matter, D50, MODE, % under 63 microns, gravels and organic matter, Sorting y Skewness.
Frequency of measurement: preview status, 1 month after the works are completed, 6 months, 1 year y 2 years.

b) numbers of sampling points, spacing of sampling points, replicates, geographic spread

Environmental aspect: Biological communities
Numbers of sampling points and spacing of sampling points: proportional to the studied surface y and the complex of the affected community.
Replicates: 2 with a minimum surface of 600 cm2.
Geographic spread: depending on the communities founded

Environmental aspect: Water Quality Monitoring
Numbers of sampling points and spacing of sampling points: proportional to the work surface.
Replicates: 1 per sample.
Geographic spread: depending on the local currents.

Environmental aspect: Sediments Quality Monitoring
Numbers of sampling points and spacing of sampling points: proportional to the studied surface
Replicates: enough to be able to complete the analysis established
Geographic spread: depending on the local currents.

c) reporting frequency , format, requirement for publication,

Reporting frequency: Partial Reports: Once is finished each sampling survey.

Final Report: Once are finished all the monitoring surveys.

Annex 8: OSPAR national contact points for sand and gravel extraction

List of national contact points for reporting on sand and gravel extraction

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To be confirmed

Annex 9: Outputs from other relevant ICES working groups

Benthos Ecology Working Group (BEWG)

The Benthos Ecology Working Group (BEWG) held its meeting in 23–27 April 2007 at Wilhelmshaven, Germany.

The work done under BEWG is especially important to WGEXT for their value to the monitoring of the environmental effects of extraction of marine aggregates.

BEWG has also showed interest to the work done under WGEXT and to the upcoming co-operative research report.

BEWG has finished a comprehensive report on the North Sea Benthos Project 2000 in which they deliver a valuable dataset on the benthos of the North Sea together with long-term evaluations and model developments. The group is planning a new North Sea benthos project in 2010.

The question concerning the effects of changing hydrodynamics and sea temperature on benthic communities cannot be answered without difficulties. Observations on a smaller scale may give contradicting results. On a large scale, changes in hydrodynamics and sea temperature are often interconnected and are a result of climatic variability as indicated by the NAO index. With regard to changes of hydrodynamics there is only little information available. On the Dogger Bank increased current velocities caused changes in sediment composition and as a consequence also in the benthic community. Off the English east coast hydrographic changes were considered responsible for changes in food availability (derived from phytoplankton) to the benthic community. Changes in the characteristics of winters and summers play an important role in structuring the benthos. If the trend of milder winters and warmer summers, also expressed by the NAO index, continues, shifts in species composition and numbers, abundance and biomass can be expected, as it is being recorded now for some of them.

The Chair answered an intersessional OSPAR request concerning listing of Cymodocea meadows in southern Europe. They were consequently listed as endangered.

Highlights of the reports were the documentation of the improvements of the coastal ecosystem at the eastern Swedish coast as evidenced by deeper algae distribution compared with historical pre-industrial records and decreasing nitrate concentration in the water. The phosphate levels seemed nevertheless to increase. This could be a result of increased bioturbation in the sediment due to the improved environmental conditions.

A national project in Belgium on Marine Biological Valuation revealed exciting new ways to value ecologically important sites in a non-monetary fashion. It will shortly be combined with MarBEF attempts to enlighten the socio-economic sides of biodiversity research.

New improved methodical investigations were reported as method harmonization and standardization was always one of the prime aims of the group. This was the sieving of fresh material vs. fixed material and a comparison of the widely used Van Veen grab and the Hamon grab which is mainly used in coarse sediments. The results showed that sieving alive negatively impacted all tested diversity measures; community-dependent relative losses of up to 35% were observed.

The group updated the list of metrics and recommended a workshop on benthos related environmental metrics.

Chair: Heye Rumohr Contact: hrumohr@ifm-geomar.de

Bureau Working Group Data Development Project

Developing and maintaining accessible marine databases are an important part of ICES Mission (ref. ICES Strategy p. 6), and several strategic goals include data management activities. The key activities are to

- *coordinate monitoring and data management programs that underpin ICES science program*
- *integrate and expand databases to support ICES programs within a well-defined data management policy*.

To ensure that ICES can fulfil its goals relative to current and future demands, an up-to-date data policy, a new data strategy and a realistic business plan are needed.

The implementation of international conventions on the use and protection of the marine area has led to new requests and needs for scientific advice and monitoring programs. Information requirements have broadened to the ecosystem perspective and include Drivers (largely human activities), Pressures (activities that interact with the environment), the present Status of the environment, and, lastly, measurement of Impacts and monitoring of Response to changes in management actions. The set of data to support these requirements is very extensive, but it is a prerequisite for undertaking research required to support new conventions and principles such as the ecosystem approach.

ICES Data vision

ICES must cope with much broader, larger sets of data in its future work. Advancing IT and database technology extend data accessibility so even decentralized and/or dispersed data residing elsewhere can be immediately available for use at meetings and workshops. ICES has an important data management role to play both as a data steward and as provider of access to distributed data. Three strategic goals have been identified:

Goal 1. ICES will remain a focal point for marine data in the North Atlantic

As an intergovernmental, permanent organization promoting science and science coordination, ICES is already in an excellent position to collate and aggregate international data. We envision ICES data to be easily accessed by the science community at large, and, in particular, by working groups and committees. Data could either reside physically at ICES (centralized system) or they could be dispersed in various databases elsewhere (distributed system).

Goal 2. ICES will create a portal serving as a hub for distributed data

In the future, much of the data needed within the ICES community may be stored in distributed systems, and we envision ICES future role as being a data hub. ICES will thus promote the development of distributed databases, as well as the development of web interfaces for the databases. In addition to data and user knowledge , ICES will provide technical assistance.

Goal 3. The ICES web portal will become more attractive to the science Community

ICES must provide services that fulfil the expectations of scientists and research groups with respect to timeliness and flexibility. ICES web portal must be the preferred option for scientists in need for quality marine data.

Chair: N. A. Nielsen/ ICES: Julie Gillin Contact: Julie@ices.dk

ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea (WGIAB)

WGIAB held its meeting in 12–16 March 2007, Hamburg, Germany. The work of this group is a good example of integrated assessment which could be applied to the other ICES zones.

The aim of WGIAB is to conduct and further develop Integrated Assessments for the different subsystems of the Baltic Sea, as a step towards implementing the ecosystem approach in the area. Key to the implementation of an ecosystem approach to the management of marine resources and environmental quality is the development of an Integrated Assessment (IA) of the ecosystem. An IA considers the physical, chemical and biological environment – including all trophic levels and biological diversity - as well as socio-economic factors and treats fish and fisheries as an integral parts of the environment. The work of this newly established working group involves (i) a further development of overview assessments, and assessments for other subsystems of the Baltic, (ii) contributions to the HELCOM assessment system, (iii) develop new monitoring strategies, (iv) develop adaptive management strategies, and (v) consider the use of ecosystem modelling in the assessment framework. WGIAB decided on 3 major goals to be accomplished within the 3 next years, which are (i) to regularly conduct RIEAs (Regional Integrated Ecosystem Assess-ments), (ii) develop adaptive management strategies and (iii) incorporate modelling into the assessment work.

Chair: Christian Möllmann Contact:christian.moellmann@uni-hamburg.de
Co-Chairs: Bärbel Müller-Karulis and Juha Flinkman

Working Group for Regional Ecosystem Description (WGRED)

The interest on the work of this group is to provide the characteristics of each of the different ecosystems included in the ICES zones and the impacts affecting each of them.

In the 2008 report WGRED has concluded that should ICES implement changes, in order to provide more integration of advice. In the past WGRED has served two main functions: preparing the regional overviews and identifying significant environmental events for attention during the assessment Working Groups' activities. It is clear that the structure and content of the overviews is mature (updating of time series, adding new knowledge, publishing, recommending some degree of standardization prior to those actions). Both of the past functions of WGRED will be better served by the more integration in Expert Groups. Such Expert Groups would have the right mix of expertise to update the Overview(s) corresponding to the region of interest to the Expert Groups as part of their basic integration of information. They would also have the right mix of expertise to identify significant environmental events, and the ideas for what to do about them in the integrated advice would be part of the core work of the Expert Group. Generating the ideas themselves, there might be a greater likelihood that the Expert Group would act on them. As a consequence, if the advisory process is adapted as needed to provide better integration of advice, then the functions currently served by WGRED would be assimilated into the basic assessment and advisory process of ICES. In that case WGRED can conclude that it has succeeded completely in its mission.

Chair: Jake Rice Contact: ricej@dfo-mpo.gc.ca

Working Group on Integrated Coastal Zone Management (WGICZM)

As the extraction is one of the activities involving in the coastal management, it is interesting to know the interaction with the other activities.

The ICZM process has been initiated in all the countries that reported to this WG, but different approaches were taken and different stages of the process had been reached. ICZM is perceived as a continuous and iterative process that should be adapted as more information is generated, new sectors developed and new questions are asked. All countries recognize the need for comprehensive coastal programmes designed to resolve conflicting demands on the use of coastal resources, maintain coastal biodiversity and ensure long-term economic sustainability. The main driving pressures may differ between countries. All countries are still struggling with implementing integrated Coastal Zone Management (ICZM). GIS maps on different resource uses and in some cases on potential resource uses have been drawn up and applied in order to manage or plan activities within local areas.

Common to most countries is the fragmented administrative and management system for the coastal zone, lack of data compatibility and poor communication between authorities. This is further compounded for managing trans-boundary eco-regions. Much effort has been put into formulating objectives for indicators, describing how to choose them resulting in proposed lists of indicators. WGICZM recognized that indicators need to be site specific and measurable and relevant at local levels in order to gain local acceptance and achieve practical application. The GICZM recognized that indicators are a primary link between science and policy for ICZM and should form the focal point for future research.

Three points were highlighted during the last meeting:

- Spatial planning which has become the dominant tool for coastal planning and integrated ecosystem management especially for the coastal zone.
- Acknowledgement that indicators for ecosystem health or status are a primary link between science and policy for ICZM and should form the focal point for future research. More specifically, indicators need to be site specific and measurable and relevant at local levels in order to gain local acceptance and achieve practical application.
- Revision and development of a framework for integrated evaluation of human impacts in the coastal zone and how to integrate this information for CZM, identifying ICES' role in the application of the WFD in the coastal zone.

Chair: Beatriz Morales-Nin Contact:ieabmn@uib.es

Working Group on Marine Habitat Mapping (WGMHM)

Habitat mapping is an important task when deciding extraction areas to protect endangered benthic communities and the management of the resources.

Such activity is a reflection of the increasing policy and management demands for habitat mapping information, WGMHM identified the need for improved coordination of this effort to ensure the resultant maps are fully compatible. This requires further work to develop common or harmonized classification schemes and to interface web delivery systems (actually new high quality, survey, broad-scale modeling and the collation of existing datasets). Despite the range and volume of habitat mapping programmes being undertaken, there is only limited internationally-agreed guidance available on the techniques which should be used.

WGMHM has reviewed available guidance (which includes a set of Recommended Operating Guidelines and survey metadata standards). WGMHM needs to consider if further guidance is required to meet the needs of ICES. The provision of accuracy and confidence assessments in habitat maps is an important new topic which WGMHM considered, the lack of such assessments to date needs to be redressed.

International programmes

Several major programmes have made substantial progress in mapping and modeling the distribution of seabed and water column habitats, for example BALANCE for the Baltic Sea; MESH for north-west Europe; OSPAR for selected habitats across the north-east Atlantic. The release of these maps represents significant progress compared with several years ago. In examining various maps available for the North Sea, WGMHM assessed the range of different data sets and methodological approaches used and identified the need for additional work to produce complete maps for the North Sea at a suitable level of detail.

National programmes

WGMHM has continued to review national programmes, providing a valuable forum for the exchange of information, techniques and strategies. WGMHM has collated much useful information in its National Status Reports (metadata on mapping programmes) during its past meetings. Bringing these reports together and making them more widely available via a web portal would greatly improve access to this work.

Mapping strategies and survey techniques

Limited attention was given to this theme during the 2007 meeting, although relevant issues were raised during other agenda items. The role of mapping and modeling in relation to pelagic habitats and fish communities was briefly examined.

Protocols and standards for habitat mapping

A review of a set of guidelines by the MESH project for deploying a range of survey techniques highlighted the need for good international guidance for habitat mapping and identified some gaps.

Uses of habitat mapping in a management context

Recognizing the importance of habitat mapping to a wide range of marine management and policy contexts WGMHM started to draw upon its experience to outline a paper on the role of habitat mapping in an ecosystem-based context. This will recognize the many areas of ICES activity for which marine habitat mapping has relevance.
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