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**INTERNATIONAL COUNCIL FOR
THE EXPLORATION OF THE SEA**

C.M. 1985/E : 5
Marine Environmental
Quality Committee



010

**REPORT ON SPECIFIC TERMS OF REFERENCE FOR A NEW WORKING GROUP
ON THE EFFECTS OF SAND AND GRAVEL EXTRACTION.**

by

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I Introduction

This report was requested by the chairman of the Marine Environmental Quality Committee at the 1984 Council Meeting, Copenhagen, Denmark. The fact that the previous WG on Effects on Fisheries of Marine Sand and Gravel Extraction, was disbanded in 1981 (R. Procès-Verbaux 1981, p. 126) was not interpreted in that way by the previous chairman MEQC that the Group was to be permanently dissolved but rather, future meetings should be held in abeyance until there appeared to be a need for further work by the Working Group, while other people seem to have understood it as a final closure of the Group.

What happened gave rise to a extensive correspondence, promises to solve the matter at a Council Meeting of the MEQC, and a growing confusion.

II Council Resolutions related to the former WG On the Effects on Fisheries of Marine Sand and Gravel Extraction

The WG on Sand and Gravel Extraction was formed under the following terms-of-reference.

C. Res. 1973/2 : 9:

"It was decided that a Working Group should be established to:

- (a) identify the effects (direct or indirect) and international implications of different methods of marine sand and gravel extraction on fisheries, particularly in the North Sea, English Channel and the Baltic;
- (b) review techniques for studying these effects;
- (c) compare national codes of practice for the control of dredging activities.

The Chairman of the Group should be Mr. A.J. Lee and it should hold its first meeting for three days in February 1974 in London".

The Working Group held its first meeting at the Fisheries Laboratory, Lowestoft on 2 - 3 April 1974.

The report of the WG was published in the ICES Coop. Res. Rep.Ser. No. 46 (1975).

C. Res. 1975/2 : 12:

The resolution reads as follows:

- (i) The Working Group on the Effects on Fisheries of Marine Aggregate Extraction ')
should meet for three days, 9 - 11 December 1975, in IJmuiden in order to:
 - (a) advise on the effects on fisheries of recent proposals for marine aggregate extraction in the North Sea and English Channel;
 - (b) advise on how the Council should deal with such proposals in future;

') Note the change of name for obscure reasons.

- (c) advise on whether the Council should propose a ban on dredging activities in certain areas of fisheries importance.
- (ii) The report of the meeting should be made available to the Advisory Committee on Marine Pollution at its mid-year meeting;
- (iii) The Working Group should also examine the recent results obtained by national programmes of research into the effects on fisheries of marine aggregate extraction.

The Working Group met at the Netherlands Institute for Fishery Investigations on 9 - 10 December 1975, with Mr. A.J. Lee as its Chairman.

The report of the WG was published in the ICES Res. Rep. Ser. No. 64 (1977).

C. Res. 1976/4 : 14:

- (i) The Council should request member countries to collect and submit maps, etc. for all areas of potential dredging activity showing:
 - (a) the distribution of different types of sediment, bathymetry, etc., and
 - (b) relevant fishing grounds, spawning areas, nursery areas, etc., and that
- (ii) Mr. A.J. Lee should be invited as Coordinator to synthesise this material together with any relevant additional information from appropriate international scientific bodies, for presentation to the next meeting of the Fisheries Improvement Committee.

The response was reported in ICES Doc. C.M. 1977/E : 68.

C. Res. 1976/4 : 15:

The Council should, as a matter of urgency, draw the attention of the Governments of member countries and of the North-East Atlantic Fisheries Commission to the potential harm to certain fish stocks from the increasing demand for marine aggregate extraction; to the fact that while fishing in the ICES area is international, decisions to dredge for aggregate on the

continental shelf are taken on an national basis; and to the lack of an intergovernmental organisation with the necessary authority to harmonise the respective requirements of the fishing industry and the sand and gravel industry. In the meantime, the Council requests its member countries not to proceed with any dredging on herring spawning grounds and other critical fishing areas.

C. Res. 1977/4 : 12:

In relation to the Report of the ICES Working Group on the Effects on Fisheries of Marine Sand and Gravel Extraction the following action should be taken:

- (a) each country should complete a representative chart, as suggested in Doc. C.M. 1977/E : 68,
- (b) completed charts should be returned to the ICES Secretariat for assembly,
- (c) the results should be reported to the Working Group so that the feasibility of a unified system of sea-use mapping could be determined,.

The response was reported in ICES Doc. C.M. 1978/E : 12.

C. Res. 1978/4 : 9:

In view of the widespread interest in charts showing different uses of the sea bed, the Bureau should investigate the practical problems in producing such charts.

C. Res. 1978/2 : 25:

The Working Group on the Effects on Fisheries of Marine Aggregate Extraction should meet for the three days, probably in The Hague, in March 1979 under the chairmanship of Dr. S.J. de Groot, and that its work should include an assessment of recent data on aggregate extraction.

The Working Group met for three days from 21 - 23 March 1979 in Rijswijk (Z.H.), The Netherlands at the Ministry of Public Works and Transport, Rijkswaterstaat, North Sea Directorate.

The report of the WG is ICES Doc. C.M. 1979/E : 3.

The WG was disbanded in 1981 (cf p.1).

III Discussion

One of the reasons for the disbanding of the WG was that some people thought that the new-established WG on Marine Sediments should take over a substantial part of the work. This, however, was not the case to any considerable extent. The Sand and Gravel Working Group was concerned with a specific activity; i.e. the extraction of sands and gravels for construction purposes and the possible effects of such mining operations on fisheries and marine life. The Marine Sediment W.G. grew out of the Marine Chemistry Working Group and is more concerned with the problem of contaminants in sediments.

A letter from the General-Secretary ICES to the Chairman of MEQC (03-05-11982 C.8.f. HTL/GP) in fact only confirmed the disbanding and added more to the confusion re the reason why the WG Sand and Gravel Extraction was dissolved.

"As you will see from the report of the Consultative Committee (R. Procès-Verbaux 1981 p. 126) it was that Committee which proposed that the group should be dissolved. You will see that the Consultative Committee noted that there would be some working groups which could not meet in the coming year, but were expected to work by correspondence, while some other were proposed to be dissolved, including the Sand and Gravel one.

This was approved by the Council without comments when the Consultative Committee's report was approved.

We do not usually send out "official notice" that a Working Group has been dissolved, since all such groups are expected to be dissolved when their work is completed. I believe other people, like me, believed that the work was completed when the bibliography had been presented, and that this had been agreed between those directly concerned. At least, no other information was given at the meeting of the Consultative Committee. There was also no report by the Group at the Statutory Meeting, and no recommendation asking for an additional meeting.

In view of the wording in Dr. de Groot's letter, that the Group had "asked to meet again once", there seems to be a misunderstanding somewhere, and I suggest that you take the initiative to have that cleared up at the forthcoming Statutory Meeting".

The statement "no report by the Group for an additional meeting" is in full contradiction with the request by the Group (ICES Doc. C.M. 1979/E : 3, MEQC, p. 19).

At the 1980 meeting it was agreed to reconvene the next or a following year. The members of the WG were informed of this decision, made to avoid disbanding!

For unknown reasons the bibliography dealing with the literature on sand and gravel extraction (ICES Doc. C.M. 1981/E : 5 MEQC) as a fulfilment of the 8 recommendation of the WG (ICES Doc. C.M. 1979/E : 3 MEQC) was observed as the last activity of the WG as intended it was just one of the activities, hence fully ignoring the opinion of the WG members.

For this reason the last WG's recommendations are here given in full as far as the majority (1 - 2 - 3 - 5 - 6 - 8) are still actual.

1. That consideration should be given to developing more direct methods of delineating herring spawning grounds that those employed by Postuma, Saville and Wood (ICES Coop. Res. Rep. 61 : 1 - 16, 1977) in order to harmonize the interests of the dredging and fishing industries.
2. That before the issue of dredging licences, information on the nature and distribution of deposits should be made available and updated at intervals during the dredging operations.
3. That a master chart should be produced showing the areas of sea bed covered by all existing charts of surface sediments within the ICES area and that such information should be sent to and coordinated by the Working Group Chairman who should also be informed by the Bureau of future developments regarding sea bed charting.
4. That a summarizing bibliography should be prepared by members on all relevant topics related to dredging (including documents by the Working Group) and be sent to the Working Group Chairman for submission as a draft to the MEQ Committee at the 68th Statutory Meeting and that additional information should be submitted annually to the MEQ Committee under a separate heading.
5. That papers published by the member's institutes, relating to the Working Group's terms of reference, should be circulated to all the members.
6. That the MEQ Committee should consider whether the Working Group's terms of reference should be expanded to include (1) the biological effects of the dumping of solid wastes, e.g. harbour dredging, sewage sludge, (2) the use of sand and gravel for offshore construction activities, e.g. the covering of unprotected pipelines, and (3) the storage and capping of polluted fine waste materials in deep dredged or natural pits.
7. That all possible effort should be made to continue the recently terminated Baie de Seine Project in order to ensure that important information be obtained from this major study on the effects of gravel dredging in view of its relevance to the study of the faunal recolonization of dredged areas.
8. That the provision of data on dredging activities should include all types of sand and gravel material removed from marine and brackish waters and that the information be returned to the Working Group Chairman by July on a standard form to be prepared for this purpose.
9. That members of the Working Group should take steps to discuss with the dredging industry problems arising from both dredging

and fishing activities and that a summary of their findings should be prepared for submission to the MEQ Committee and the General Secretary.

10. That a further meeting of the Working Group should be held in April or May 1980 for three days.

IV Recommendations

The survey of the activities in the field of sand and gravel extraction, initiated by the present chairman of the MEQC has revealed many new developments in Member-States. Partly these developments are already being realized or in an advanced planning stage. Several scientists have therefore expressed the view that the Working Group on the Effects on Fisheries of Marine Aggregate Extraction should be re-installed.

It is suggested that the Working Group should work on similar lines as previously, but that the developments and physical effects of large dredging operations in sea approaches and harbours and the subsequent disposal of the dredgings (in islands or pits) could be added to the task. Such additions should, however, be discussed at the Council Meeting 1985 (See also APPENDIX I - United Kingdom, Dr. A. Preston's communication).

V Terms of reference

On this basis, the terms-of-reference for the Working Group on the Effects on Fisheries of Marine Aggregate Extraction may be:

- a. To update the present status of marine aggregate dredging and its impact on the marine environment.
- b. To examine the recent results obtained by national programmes of research into the effects on fisheries of marine aggregate extraction and the non-chemical effects of disposing dredged materials.
- c. To compare the national codes of practice for the control of dredging activities and to evaluate the changes since 1979.
- d. To provide information on near-future activities and the possible impact on the marine environment and the effects on fisheries.
- e. To advise the Council on major issues where an ICES policy is needed.

VI Plan of work

It is understood that the discussion planned at the next Statutory Meeting (1985) may lead to the reinstating of the Working Group. This would immediately call for the following plan of work for a new Working Group:

1. Prepare state-of-art report, making extensive use of reports already in existence.
2. Carry out an assessment of conflicting situations which may arise between the industry and the fisheries, or the different natural levels and the fisheries.

The business of the new Working Group can be handled both through correspondence and during scheduled meetings e.g. with an interval of 2 years.

APPENDIX I

Information given in answer to the request of 09-11-1984 on the present status of sand and gravel extraction, dredging of sea channels and harbour approaches, building of artificial structures (e.g. islands, reclaiming land in the coastal zone), disposal of the dredged material.

FINLAND

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Information supplied by Paavo Tulkki, Institute of Marine Research, Helsinki and Pentti Kangas, Water Research Institute, National Board of Waters, Helsinki.

Dredgings in 1968-1982:

22.6 mill. m³, incl. sand and gravel extraction, 0.4 mill. m³, in 29 areas (Fig. 1).

Future dredgings and sand & Gravel extraction in 1983-1993:

Dredging of sea channels 4 mill. m³, extraction of sand & gravel 4 mill. m³, costs 30 mill. FIM, in 24 areas.

Concentrations of heavy metals (mg/kg) in dredged material, compared with values from clean and polluted bottoms:

	Hg	Pb	Cr	Zn	Cu	Cd
Dredged material	0.01-4.5	0.9-740	1.6-106	19- 605	3.5-280	0.05-11
Polluted sediments		22 -462	36 - 79	76-1805	8 -209	0.4 - 6.4
Clean areas	<0.1	10 - 50	6.7- 90	13- 268	2.7- 33	0.1 - 0.5

The above information is from the study by Karlsson, 1983.

An example of an underwater esker and gravel formation off the south coast of Finland is given in Fig. 2.

New legislation

----- The act Nr. 555/1981 (Act on soil extraction) demands permission by the communes and municipalities for sand and gravel extraction. If a risk to the water environment can be foreseen, permission by the Water Court is needed according to the Water Act. When sand and gravel extraction takes place in a sea area owned by the State, permission is given by the authority, which controls the area in question. Also in this case permission of the Water Court is needed if a risk for environmental deterioration is expected.

Literature

Karlsson, O., 1983 - Effects of dredging operations on the aquatic ecosystem and fisheries on the Finnish coastal waters. - Abo Academi. Mimeogr., 115 pp. (In Finnish, English and Swedish summaries). (The list of literature consists of 127 articles and books).

Bonsdorff, E., 1980 - Macrozoobenthic recolonization of a dredged brackish water bay in SW-Finland. - Ophelia, suppl. 1 : 145-155.

Taipalinen, I., 1980 - The effects of dredging on water quality in lake Kallavesi. National Board of waters, Rep. 39 : 37-45.

FRANCE

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Information supplied by A.P. Cressard - IFREMER Centre de Brest, Brest.

Since 1979 the number of extraction is stabilized along the French coast, especially the Atlantic and Channel coasts (figure 3). New is the way to ask for licences and the stipulated impact study. In 1984 the 2nd International Seminar on Offshore Mineral Resources was held, special subject was. Trends of the marine mining technology in the nineties: What future for offshore mineral resources? The seminar was organized by the Groupe d'Etude et de Recherche de Minéralisations au Large (GERMINAL). The proceedings will be published soon.

An important recent publication is:

Augris, C. and A.P. Cressard (1984): Les granulats marins. Publications du Centre National pour L'Exploitation des Océans (CNEXO), Rapports scientifiques et techniques - No. 51: 1-89.

1. La Législation

L'exploitation des sables et graviers siliceux marins entre dans le champ d'application de la législation minière.

Longtemps considérés comme produits de carrière ou comme produits de mines - suivant qu'ils se situaient à l'intérieur ou à l'extérieur des eaux territoriales (donc en deca ou au-delà de 12 milles nautiques) - les granulats marins relevaient, pour leur exploitation, d'une réglementation applicable au domaine terrestre et totalement inadaptée au domaine maritime.

Avec la loi no. 76-646 du 16 juillet 1976 (1) relative à la prospection, à la recherche et à l'exploitation des substances minérales non visées à l'article 2 du Code Minier et contenues dans les fonds marins du domaine public métropolitain, suivie des décrets no. 80-470 du 18 juin 1980 (3) portant application de cette loi et no. 80-204 du 11 mars 1980 (2) relatif aux titres miniers, la réglementation applicable à l'exploitation des granulats marins prend une orientation "maritime" et s'adapte à ce milieu très spécifique.

Qu'ils soient situés à l'intérieur ou à l'extérieur des eaux territoriales, les sables et graviers siliceux marins sont désormais considérés comme produits de mines (on envisage d'y inclure les sables calcaires et le maërl).

Leur exploitation est donc soumise à la délivrance de titres miniers. Les demandes de titres et d'autorisations domaniales faisant l'objet d'un dossier unique comprenant notamment une évaluation des quantités de substances que le demandeur envisage d'extraire annuellement sont définies par l'arrêté du 6 novembre 1980 (4). Les autorisations domaniales sont délivrées pour la durée du titre minier. L'exploitation est frappée d'une redevance domaniale définie comme redevance d'occupation temporaire du domaine public maritime.

La prospection, la recherche et l'exploitation des granulats marins font désormais l'objet de titres miniers délivrés par le Ministre chargé des Mines.

La mise en place de cette nouvelle réglementation ouvre la voie d'une exploitation rationnelle des ressources minérales sous-marines et doit permettre enfin le développement de l'exploitation des granulats marins.

(1) J.O. du 17.07.76

(3) J.O. du 27.06.80

(2) J.O. du 16.03.80

(4) J.O. du 13.01.81

2. Les activités

- L'extraction.

L'extraction est réalisée au moyen de deux techniques bien distinctes: le prélèvement mécanique par benne preneuse et l'aspiration hydraulique par pompe.

La plus ancienne, la technique de la benne preneuse, est encore largement utilisée: elle équipe 22 navires sur les 40 en service en France. Cette technique est particulièrement adaptée à l'exploitation des accumulations limitées en superficie et de grande épaisseur.

- Le déchargement.

Tous les navires sabliers armés en France sont de type "porteurs" et "auto-déchargeurs". De même que pour l'extraction, deux techniques sont principalement utilisées pour décharger les matériaux extraits: la benne preneuse et le refoulement hydraulique.

Mise en oeuvre par mât de charge ou par la grue du bord, la benne preneuse est utilisée pour le déchargement à sec des matériaux.

A l'inverse, le déchargement hydraulique impose de réinjecter de l'eau dans la cale du navire pour fluidifier les matériaux extraits et les aspirer au moyen de la pompe du bord qui les refoule sur le quai dans un bac de décantation.

Plus rapide, cette deuxième technique nécessite cependant un investissement supplémentaire pour la construction de bacs de décantation et ne permet pas l'utilisation immédiate des matériaux déchargés.

Les matériaux marins exploités dans les eaux territoriales françaises sont débarqués dans 28 ports du littoral compris entre Calais et Bordeaux et représentent, pour certains, la quasi totalité du trafic portuaire.

- Le traitement.

Les matériaux marins exploités en France sont l'objet de traitement plus ou moins élaborés selon leur destination. Le but des opérations est d'améliorer, par des méthodes physiques et mécaniques, la qualité et la présentation des matériaux sans en altérer leur valeur propre.

De nombreuses installations de traitement fonctionnent avec le lavage, le criblage, accessoirement le broyage des éléments les plus grossiers, l'élimination des coquilles, afin de répondre aux spécifications granulométriques du marché.

- La production

La production totale de matériaux marins exploités en 1982 dans les eaux territoriales françaises a été de 4 Mn de tonnes de sables et graviers siliceux et de 0,6 Mn de tonnes d'amendements calcaires, auxquels il faut ajouter environ 1 Mn de tonnes débarqués provenant d'Angleterre (tableau - source S.N.A.M.).

Les matériaux marins représentent environ 1,2 % de la production globale des granulats; le chiffre d'affaires réalisé par l'armement français est d'environ 80 millions de francs.

	Production en tonnes		
	1980	1981	1982
Amendements calcaires marins exploités dans les eaux territoriales françaises	481 724 t	498 034 t	525 011 t
Sables et graviers exploités dans les eaux territoriales françaises	3 696 434 t	3 798 105 t	4 159 542 t
Sables et graviers marins Importations	1 185 153 t	1 135 102 t	1 048 561 t

GERMAN FEDERAL REPUBLIC

Information supplied by Prof. K. Tiews - Bundesforschungs Anstalt für Fischerei, Hamburg.

The laws and regulations covering the mining of sand and gravel can be found in the Bundesberggesetz (BBerg 6) of the 13th of August 1980, published in Bundesgesetzblatt Jahrgang 1980, Teil I - 1310 - 1363. Especially paragraphs 49 and 132 - 137.

An overview (1979) was published by the Deutschen Fischerei-Verbandes under the title: "Probleme der Koexistenz von Fischerei und anderen Wirtschaftszweigen bei der Nutzung des Deutschen Festlandsockels der Nordsee" in Arbeiten des Deutschen Fischerei-Verbandes, 27: 1-183. The policy underlying the activities on offshore sand and gravel dredging is summarized on p. 76-80 of this publication.

Niedersachsen.

- 1). Dredging of sea channels and harbour approaches to keep a steady depth
 - Jade
 - Weser
 - Ems
- 2). Reclaiming land in coastal zone.
 - None at present, Ley-Bucht possible in future.

- 3). Material taken and to be taken in future in order to enforce, enlarge or build dikes:
several places along the North Sea coast of Niedersachsen.
Material mainly taken from the Wadden Sea.

- 4). Enforcing the eroded shores of mainland and islands:

!Year	!Project	!Amount of dredged !material	!Remarks	!
!1982	!Norderney	!0.55 mio m ³	!Sand mainly	!
!1984	!Norderney	!0.41 mio m ³	!taken to keep a steady	!
!1982	!Langeoog	!0.3 mio m ³	!depth in Ems, Jade, Weser	!
!1984	!Langeoog	!0.3 mio m ³	!	!
!1983	!Wangeroog	!	!	!
!	!west point	!0.75 mio m ³	!	!
!1984	!Borkum	!	!	!
!	!west point	!appr. 0.5 mio m ³	!	!

Schleswig-Holstein

- 1). Dredging of sea channels and harbour approaches to keep a steady depth (permanently).

Hamburg
Brunsbüttel
Glückstadt
Friedrichskoog
Büsum
Tönning
Husum
Dagebüll

- 2). Reclaiming land in coastal zone

!Year	!Project	!Status	!Length of !dike km	!Reclaimend !land (ha)	!
!1982	!Tondoner Marsch	!finished	!4.2	!550	!
!planned	!Ockholmer Koog	!planned	!3.3	!90	!
!1982-1988	!Hattstedter Marsch	!in progress	!8.9	!3 345	!
!planned	!floodable	!	!	!	!
!	!connecting barrier	!planned	!15.0	!-	!
!	!(dike) from	!	!	!	!
!	!mainland to	!	!	!	!
!	!Pellworm	!	!	!	!

- 3). Material taken and to be taken in future in order to enforce enlarge or build dikes: several places along the North Sea coast line of Schleswig-Holstein.

Material mainly taken from the Wadden Sea.

4a).Enforcing the eroded shores of mainland and islands (North Sea).

! Year	! Project	! Amount of dredged material	!
! 1972	! Westerland (Sylt)	! 1.1 mio m ³	!
! 1975	! Fohr	! 0.5 mio m ³	!
! 1978	! Westerland (Sylt)	! 1.0 mio m ³	!
! 1983	! Hornum (Sylt)	! 0.56 mio m ³	!
! 1984	! Rantum (Sylt)	! 0.3 mio m ³	!
! 1984	! Westerland (Sylt)	! 1.0 mio m ³	!
! 1985	! Sylt	! 0.5 mio m ³	!
! for the next	!	!	!
! 5 years planned	! Sylt	! 2.0 mio m ³ per year	!
! after 1990	!	!	!
! planned	! Sylt	! 1.0 mio m ³ per year	!
! planned	! Southcoast of Fohr	! 1.0 mio m ³	!
! planned	! Wittdun (Amrum)	! unknown	!

4b).Enforcing the eroded shore (Baltic Sea).

! At several	parts of the baltic coastline	!
! 1980	(Eckernforde)	!
!	(Schonberg) small quantities	!
!	(Scharbeutz)	!
!	(etc)	!

5). Sand and gravel extraction (Baltic Sea)

Stoller Grund (near Eckernförde) since 1971

quantities	appr.	2 Mio m ³
1971	0.4 Mio m ³	
1972	0.025 Mio m ³	
1973	0.010 Mio m ³	
1974	0.422 Mio m ³	
1975	-	
1976	-	
1977	-	
1978	0.023 Mio m ³	
1979	0.106 Mio m ³	
1980	0.022 Mio m ³	
1981	0.138 Mio m ³	
1982	-	
1983	-	
1984	0.202 Mio m ³	

ICELAND

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Information supplied by Jón Olafsson, Marine Research Institute, Reykjavik.

It seems that in the near future the extractions will remain on a scale similar to that of recent years. The effects on marine life of these extractions, or of the dredging of harbours or their approaches, have not been investigated. Such investigations will probably not be initiated unless proposals come forward for increased extractions, e.g. from herring spawning grounds or other regions important for fisheries.

In 1984 390.000 m³sand, 260.000 m³gravel and 115.000 m³calcareous material was dredged in Faxa Bay.

THE NETHERLANDS

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Information supplied by Drs. A.A. Beukema, Rijkswaterstaat - Directie Noordzee, Rijswijk (Z.H.); Dr. R.T.E. Schüttenhelm, Rijks Geologische Dienst, Haarlem; Dr. S.J. de Groot, Rijksinstituut voor Visserijonderzoek, IJmuiden.

Sand and gravel extraction

Last year 52.572 m³ sand were extracted from the blocks S4 and S7. 2.068.010 m³ were extracted from the harbour approach to IJmuiden. So a total of 2.210.582 m³ were taken ashore and were used in building highroads or elsewhere.

No gravel was extracted in Dutch Continental waters. However, there are possibilities to extract gravel in the future in the area of "Klaverbank" (See below). The sand extractions may increase if industries need it and objections against salt in seasand can be taken away.

The government will promote the use of seasand but meets many opponents because of the salt in seasand.

Dredging sea channels and harbour approaches

To make work with work is what is meant when sand is used ashore, that comes from building sea channels and harbour approaches.

In former years sand from Euro- and Maas-channel was used ashore and nowadays sand from the IJmuiden entrance is used. (52.5 ft channel). However, the longer the distance the more expensive the sand will be. Sand which can not be used elsewhere is dumped on other places in the North Sea.

Enforcing eroded shore

The coastal lines of the islands of Goeree and Texel are eroded and are to be enforced. These projects are still in progress so at this moment the amounts are not known. In spring of next year the coast near Scheveningen will be enforced; the amount to be used is estimated at 350.000 m³.

The disposal of dredged material

Dredging and disposal at sea takes place in the harbours of Rotterdam, Scheveningen and IJmuiden.

In 1983 from Rotterdam entrance/harbour about 18.943.972 m³ was dumped at sea. From Scheveningen harbour a total quantity of 188.003 m³ was dumped. Totally dumped from IJmuiden harbour in 1983 were some 3.624.260 m³.

In future disposal of dredged material will decrease because requests for permission are refused for some sorts of material.

Geology of the Quaternary in the Southern Bight of the North Sea

The British Geological Survey and the Rijks Geologische Dienst are jointly publishing a series of scale 1 : 250.000 maps of amongst others Quaternary sediments of the North Sea along the median line between the British and Dutch sectors. The Early Pleistocene deposits show an upward transition from marine to deltaic and fluvial sediments.

The succession is clearly subdivided by unconformities on seismic profiles, defining boundaries between the largely seismo-stratigraphic units (formations). Each has characteristic seismic facies. The unconformities are interpreted as indicating significant periods of non deposition.

The sedimentary record from the Middle Pleistocene onwards comprises a number of lithostratigraphic units ranging from marine transgressive sediments to tidal flat deposits, lacustrine clays and various non-marine, including glacial deposits. Also the sediments of the Holocene marine transgression have been subdivided into a few formations each with a characteristic lithology.

Further reference:

Laban C., T.D.J. Cameron & R.T.E. Schüttenhelm. Geologie van het Kwartair van de zuidelijke bocht van de Noordzee (Geology of the Quaternary in the Southern Bight of the North Sea). Meded. Werkgr. Tert. Kwart. Geol., 21(3): 139-154, 11 figs. Leiden, September 1984.

Gravel extraction Botney-Cut area (Klaverbank) (Fig. 4).

Gravel has been located after an extensive search in an area 155 km northwest of Den Helder, blocks K1 and E16, on the southeast edge of the Doggerbank. The gravel is just outside the area, which according to ICES, should be protected from aggregate dredging. It was, however, a spawning area of the now disappeared Doggerbank herring. The gravel content in the area shown on figure varies between 30 - 80 %. The depth is about 30 - 40 m, infact just below normal operation depth of hopperdredgers. At present the gravel is offered to the industry for exploitation, however, the costs are just above those of gravel mined along the Norfolk coast. Also the working depth of the dredgers is seen as a disadvantage.

Further reading:

Anon., 1984 - Grindvoorkomens in het Klaverbankgebied. IRO-Journaal, 8(51/52): 1.

NORWAY

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Information supplied by T. Hognestad - Status Biologiske Stasjon Flodevigen, Arendal. This in consultation with the Institute of Marine Research, Bergen and the Norges Geologiske Undersokelser, Trondheim.

The present status of sand and gravel extractrion in Norway is as before. It is therefore nothing to add to what was mentioned in ICES Coop. Res. Rep. 46, 1975; Coop. Res. Rep. 64, 1977 and ICES C.M. 1979/E : 3.

Norway has no offshore extraction of sand and gravel. Production is limited to small scale operations in fjords and river outlets, in general of no concern to fisheries interest. Further planned activities for sand and gravel extractions are not known.

Any research on sand/gravel extraction is not known. In 1976 there was made a report (in Norwegian) on the subject:

Kristian Bjerkli: Sand og grus i Kyst-Norge. Oversikt over ressurs-situasjonen og undersjøiske masseuttak. ("Sand and gravel in Coast-Norway. Review over the resource situation and sub marine mass extractions"). NGU Rapport nr., 1335/.1.1975/76.

POLAND

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Information supplied by Prof. J. Popiel, Marine Fisheries Institute, Gdynia.

Marine gravel has been extracted since 1977 on a restricted scale on the Slupsk bank (Southern Baltic). An expansion of this activity is planned in this area. Also other areas are being investigated for the same purpose.

Research is carried out to monitor the influence of the gravel extraction for the environment.

SWEDEN

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Information supplied by H. Hallbäck, Institute of Marine Research, Fishery Board of Sweden, Lysekil.

During the last years the extractions of sand and gravel has decreased and are now, 1984, about 110.000 m³. Almost all extractions take place in the Öresund. Denmark has asked for licences to extract about 500.000 m³ yearly within the Swedish continental area in the Kategatt.

If the licences will be permitted Swedish fishery authorities fear the consequences because this area is a very important fish- and shellfish ground.

UNITED KINGDOM

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Information supplied by A. Preston, Fisheries Laboratory MAFF, Lowestoft.

Whilst there has been something of a moratorium on marine aggregate

extraction in the United Kingdom's EEZ, no doubt related to the economic recession and sharp reduction in the construction industry, there are signs of a reawakening and we would therefore welcome a further meeting of the Working Group to explore the state of play in other countries, and to ensure that a properly thought out integrated position is developed in relation to offshore aggregate extraction, especially where it is significant for international fisheries.

Since the last meeting of the WG, there has been an emphasis in England and Wales, at a policy level, on increasing the proportion of marine aggregate usage. This has resulted in a recent major application to dredge gravels off the Channel coast and may lead to further applications. Correspondingly, future research requirements to ensure adequate protection for fisheries interests are under consideration at present. A Code of Practice has been drawn up relating to the process of consultation necessary between dredging companies, the State and fisheries interests when licence applications are being considered.

In our view it would be useful for the Working Group to meet in order to:

- (a) Review national aggregate extraction programmes since 1979.
- (b) Review current national regulatory procedures.
- (c) Review current national research programmes.
- (d) Make recommendations on management practice and research

We believe the Group's remit should include all aggregates (sand, gravel, maerl, solid minerals) but not dredging and dredge spoil disposal (which are dealt with satisfactorily in the Oslo Commission by SACSA) or artificial structures (islands, reclamations, etc).

Information supplied by A.P. Cressard - IFREMER Centre de Brest, Brest, France.

La Grande-Bretagne reste le pays qui, depuis 1959, utilise de façon courante les matériaux marins pour son équipement. A cette époque, ce pays extrayait 3,9 millions de tonnes équivalant à 5,7 % de la production totale des granulats. Actuellement, avec 19 %, représentant 16,5 millions de tonnes, elle est le premier producteur européen de granulats marins (figure 5).

L'étude des ressources est liée, en Grande-Bretagne, à l'octroi de permis de recherche et d'exploitation. L'entreprise intéressée se charge elle-même de la prospection, et les résultats obtenus sont sa propriété.

Cependant, les renseignements sont regroupés à l'Institute of

Geological Sciences et au Crown Estate, organisme qui n'a pas d'équivalent en France. Les huit membres de cet organisme, "Crown Estate Commissioners", sont nommés par le gouvernement et délivrent les permis d'exploration et d'exploitation à l'intérieur des eaux territoriales.

Le permis de recherche autorise une société à prospecter pendant deux ans et à prélever jusqu'à 1 000 tonnes de matériaux pour les analyses.

L'obtention du permis d'extraction exige un procédé plus compliqué. Les commissionnaires consultent d'abord le ministère de l'Environnement; s'il existe un danger d'érosion des côtes, le permis est refusé sans recours possible. D'autre part, les commissionnaires consultant le ministère de l'Énergie pour l'emplacement des oléoducs et gazoducs, le ministère de la Défense pour les zones réservées à la Marine et le Département des Postes pour l'emplacement des câbles sous-marins.

Si un désaccord existe, les commissionnaires procèdent à des négociations afin de trouver une solution satisfaisante. En cas de désaccord, l'exploitation peut être interdite partiellement ou entièrement; il n'existe pas d'autorité officielle pour décider de la valeur des arguments des différents ministères.

Les entreprises anglaises ont souvent deux sources d'approvisionnement: marine et terrestre. Les matériaux terrestres sont, la plupart du temps, transportés par route, le réseau ferroviaire étant insuffisant. Ces ressources sont importantes mais la réglementation sur l'environnement est draconienne de sorte que, de plus en plus, il sera nécessaire d'importer des matériaux marins.

Dans ce contexte, les granulats marins ont effectué une percée importante sur le marché. L'exemple du sud-est de l'Angleterre avec Londres est caractéristique. En effet, les dragues peuvent remonter la Tamise et arriver jusqu'au centre de la capitale. Les matériaux sont traités sans avoir subi aucune rupture de charge depuis le gisement. Un court voyage routier les amène sur les lieux de consommation. Ainsi, le coût des transports n'a qu'une influence limitée sur le prix des granulats marins.

De ce fait, les entreprises se sont développées et ont acquis des moyens techniques plus importants. En 1960, les dragues avaient une capacité moyenne de 700 tonnes et étaient déchargées à quai par des grues terrestres. Actuellement, la capacité moyenne est de 3 000 tonnes et les bateaux déchargent leurs matériaux eux-mêmes.

L'industrie britannique des sables et graviers marins se répartit en sept importantes compagnies qui fournissent 95 % des matériaux dragués dans la Manche et dans la mer du Nord. Les 5 % restant proviennent d'une dizaine de petits exploitants travaillant dans les estuaires et les rivières.

La production annuelle de matériaux marins est de 26 millions de tonnes dont destinés aux ports du nord de la France, de la Belgique et de la Hollande.

Les producteurs de granulats terrestres et marins sont regroupés dans une association qui compte 190 sociétés: S.A.G.A. (Sand and Gravel Association). Son but n'est pas le commerce, mais concerne surtout les problèmes techniques, l'utilisation des sables et graviers, l'information sur l'évolution des lois en vigueur et la promotion de leur profession. Pour la partie marine de cette association, elle s'attache en plus à assouplir les liens avec les administrations qui réglementent l'extraction en mer.

UNITED STATES

Information supplied by H. Bokuniewicz, Marine Sciences Research Center, State University of New York at Stony Brook, Long Island, NY 11794.

As far as I know, there is no significant offshore sand mining being done in United States waters but there is still interest in developing this resource. (On a small scale, I believe that a dredging company in New York has applied to mine sand from the main shipping channel for aggregate). The U.S. Geological Survey has embarked on a program to examine cores and seismic reflection records for evidence of placer deposits of heavy minerals. In addition, the Sea Grant Institute is planning to convene a meeting in New York in the fall of 1985 to examine offshore sand and gravel deposits as an exploitable resource. I am on the steering committee for that meeting and we would very much like to have some participation from the European community.

There is also continuing interest in the use of subaqueous borrow pits for the burial of contaminated sediment. The option is still being investigated for use in New York Harbor. An environmental impact statement has been prepared for a burial project involving about 1 million cubic yards in an existing borrow pit in New York Harbor and a small project has recently been completed in the Duwamish Waterway, Seattle, Washington. The project in Washington involved the placement of about 5000 cubic yards in a depression on the floor of the Waterway and its successful capping with sand. Studies of cap stability are continuing in Long Island Sound, Connecticut and at the Mud Dump Site on the Atlantic shelf off New York Harbor. The U.S. Army Corps of Engineers' Waterways Experiment Station in Vicksburg, Mississippi is in the midst of a laboratory study to assess the effectiveness of sand caps to contain contaminants and the partial results I have seen thus far suggest that capping is effective in isolating and containing contaminants.

References, all published in, Montgomery, R.L. and J.W. Leach (Editors), 1984 - Dredging and dredged material disposal, vol. 2,

Proceedings of the Conference Dredging '84. Published by Amer. Soc. Civ. Eng., New York.

- Brannon, J.M., R.E. Hoeppel & P. Cunnison - Efficiency of capping contaminated dredged material, p. 664-673.
- Demara, K.R., R.P. Long, S. Stranton & W. Charleton - Settlement and stability of ocean disposal mounds, p. 1040-1049.
- Sumeri, A. - Capped in-water disposal of contaminated dredged material, p. 644-653.

APPENDIX II

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The Working Group members as given in Procès-Verbal de la Réunion 1980 (Jan. 1981) were:

Dr. <u>S.J. de Groot</u>	- <u>The Netherlands, Chairman</u>
Dr. O. Bagge	- Denmark
Dr. A. Cressard	- France
Dr. Y. Desaunay	- France
Dr. V. Dethlefsen	- FRG
Dr. B.I. Dybern	- Sweden
Mr. M. Geoghegan	- Ireland
Mr. H. Hallbäck	- Sweden
Mr. J.D. Holstein	- The Netherlands
Mr. A. Hornsten	- Sweden
Mr. R. Keary	- Ireland
Dr. G. Kühlmorgen-Hille	- FRG
Mr. A. Lane	- USA
Mr. R. Ljoen	- Norway
Mr. D. Martens	- Belgium
Dr. A.D. McIntyre	- Scotland
Mr. R.S. Millner	- England
Dr. E. Oele	- The Netherlands
Mr. G. Ottevanger	- The Netherlands
Dr. J.W. Padan	- USA
Dr. M. Parker	- Ireland
Dr. J.B. Pearce	- USA
Mr. M.S. Rolfe	- England
Dr. P. Tuunainen	- Finland
Dr. G. Wiersma	- The Netherlands

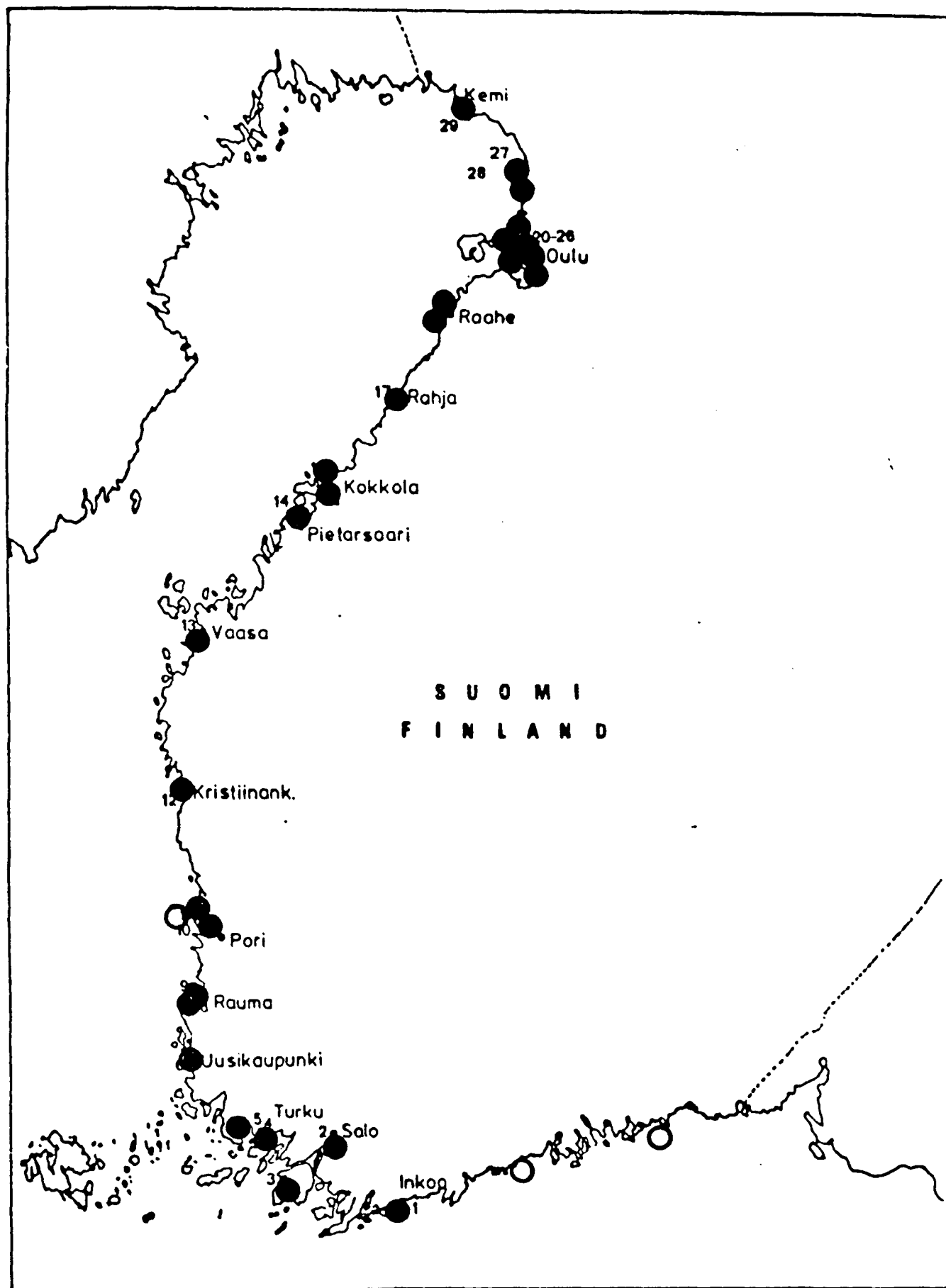


Fig. 1. Localities of sand and gravel extraction ○ and construction of sea channels in 1968-1982 ●.

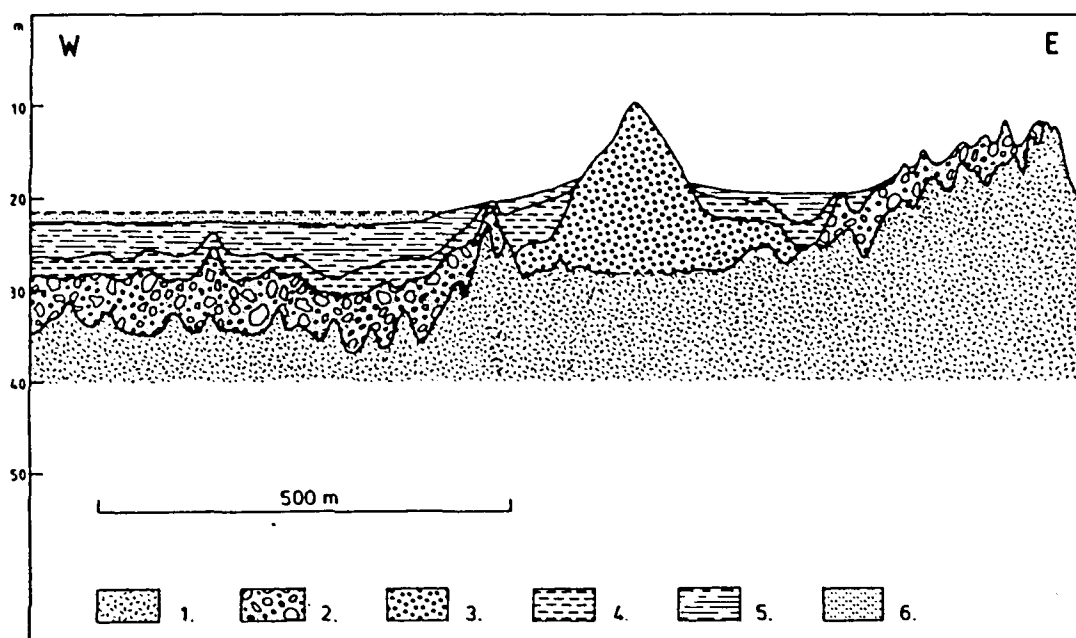


Fig.2 . An example of an underwater esker and gravel formation off the south coast of Finland.

1. Basement, 2. Moraine, 3. Esker, 4. Glacial silt, 5. Glacial clay, 6. Recent gyttja clay.

(According to Boris Winterhalter, 1984. Ympäristö ja Terveys 8).

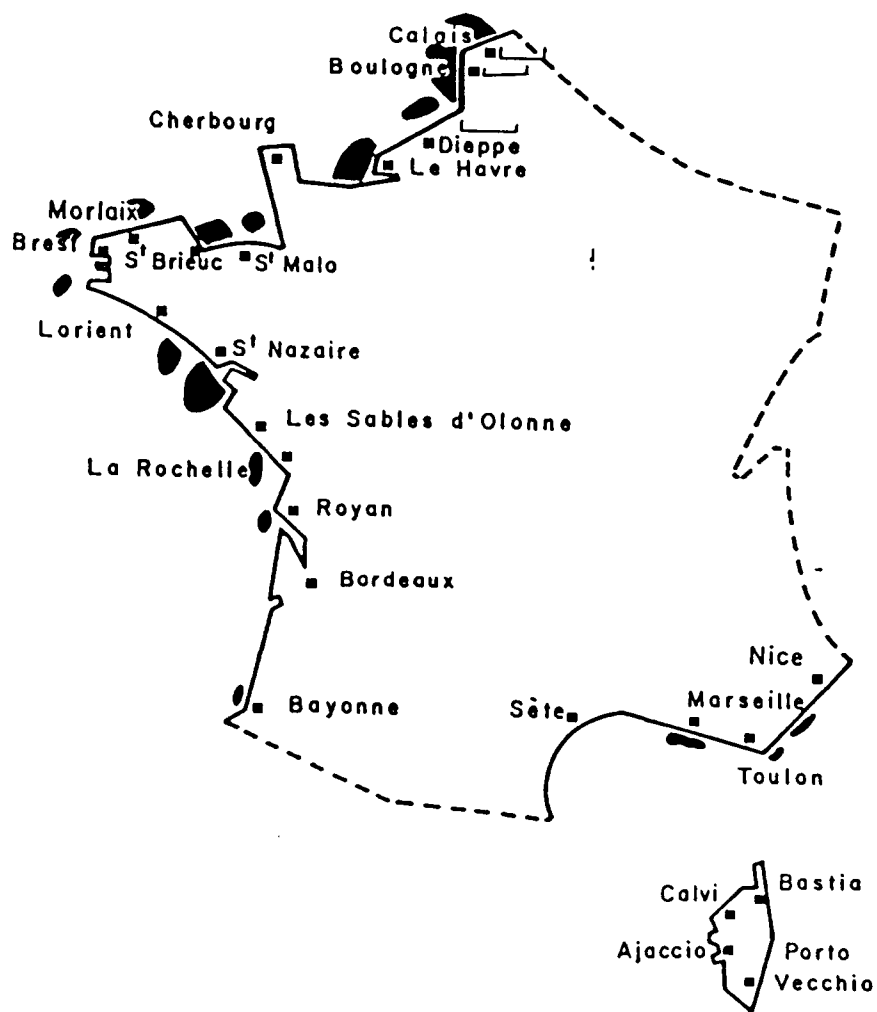


Fig.3: Zones prospectées par le CNEXO.

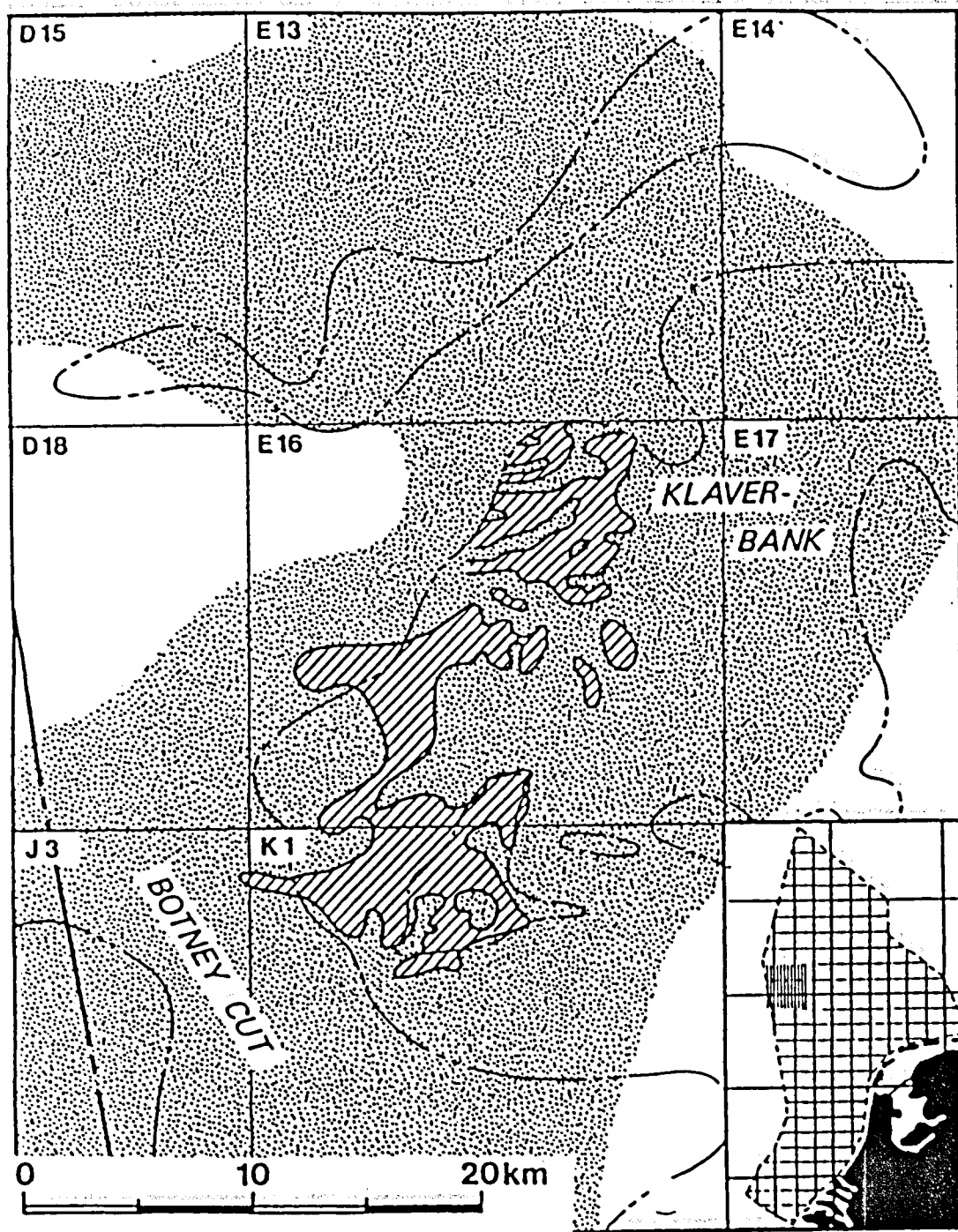


Fig. 4. Hatched area gravel content > 40%

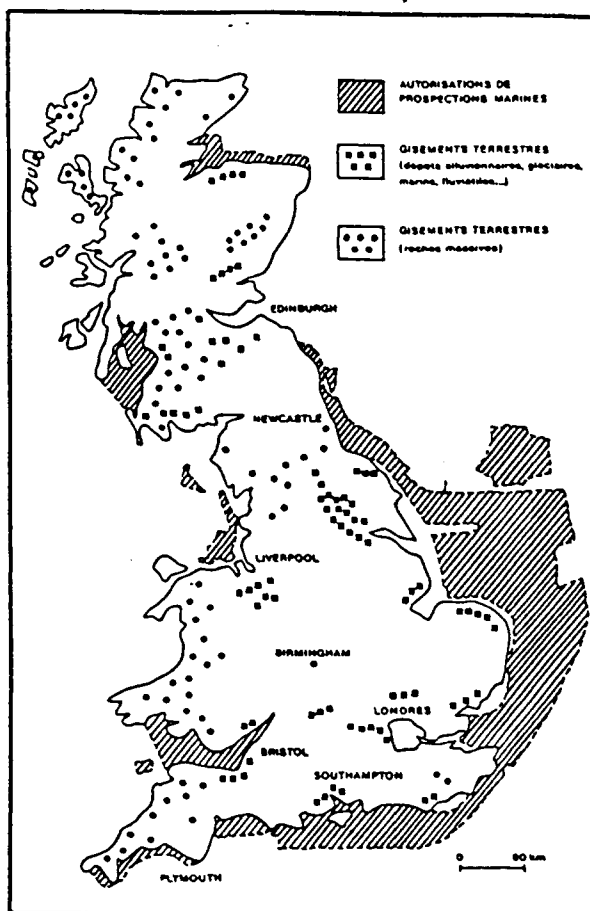


Fig. : 5
Les granulois marins
en Grande-Bretagne.

