

MARINE ENVIRONMENTAL QUALITY COMMITTEE

by

B.I. Dybern

1985



THÜNEN

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Belgium

(W. Vyncke)

- The new oceanographic vessel "Belgica" was commissioned in 1984. The thus increased possibilities of research at sea are mirrored by the considerably expanded number of missions in 1985.
- 1. The effects of dumping industrial wastes off the Belgian coast on the fish and shrimp stocks and invertebrates were studied further.
A biological and physico-chemical survey was carried out every three months.
- 2. The biological and physico-chemical monitoring of the Kwinte Bank, Buiten Ratel, Oostdyckbank where sand extractions are taking place was continued.
- 3. The monitoring programmes on heavy metals and PCBs in fish and shellfish were continued. Samples of cod, flounder, brown shrimps and mussels from the Southern North Sea were analyzed (JMJ area 1).
- 4. The radioactivity of sediments and samples of fish and shellfish from Belgian coastal waters and from the Irish Sea was measured.
- 5. Studies on fish pathology were continued in Belgian coastal waters, especially in dumping areas.
- 6. Continuous survey of the water quality in the Belgian zone of the continental shelf and in the Western Scheldt estuary, with respect to the national obligations towards the Oslo and Paris Conventions and the EEC Directives. Parameters measured refer to hydrography, nitrogen nutrients, chlorophyll and pollutants. The survey grid comprises 30 sampling stations.

7. Study of geomorphological characteristics of the sediments with development of several techniques.
- Study of residual movements of sediment and changes of superficial sediments topography in relation with sand mining.
- Detailed study of Holocene deposits off the Belgian coast.
- Quaternary and tertiary sediments in the Southern Bight (cartography, stratigraphy, structure).
8. Monitoring of benthic populations (coastal and sand banks) in relation with sand mining and/or COST 47 programme.
- Study of the relation between interstitial benthic fauna and sediment characteristics.
9. Study of air-sea interactions and characterization of aerosols.
10. Study of the dynamics of phosphates in estuarine and sea environments.
- Study of the dynamics of phosphorus in recent estuarine and sea sediments.
11. Study of the ecology and the biogeochemistry of marine systems. Study of frontal structures.
12. Study of the influence of terrigenous inputs of nutrients on primary production. Simultaneous study of metal inputs.
13. Study of the flux of heavy metals to and from the sediments as well as horizontal transport of metals.
14. Study of the kinetics of uptake of nitrogen by phytoplankton.

Canada

No report received

Denmark

Greenland

(P. Johansen)

1. Monitoring studies continued in a fiord system in North West Greenland affected by heavy metal pollution from a lead and zinc mine and mill. Lead, zinc, cadmium, and copper are monitored in sea water, sediments and marine organisms including brown algae, mussels, shrimp, fish, sea-birds and seals.
2. Monitoring studies of heavy metals in seaweed and the blue mussel continued in a fiord at a cryolite mine in South Greenland.
3. A 3-year project "Heavy metals in the Greenland marine environment" was initiated.

The main purposes of the project are:

- 1) To advise the local population on the quality of marine food products with regard to the concentration of mercury.
- 2) To find the mechanisms behind the buildup of high cadmium concentrations in arctic marine mammals.

The project involves the analysis of samples of seawater, sediments, invertebrates, fish, marine mammals, and birds from 9 regions in West and East Greenland for cadmium, mercury, selenium, and zinc.

Finland

See Appendix.II.

France

No report received

German Democratic Republic

No report received

Germany, Federal Republic of

No report received

Iceland

No report received

Ireland

(M.P.O ' Sullivan)

1.
Contaminant monitoring (metals and organohalogens) in fish and shellfish from selected areas around the coast of Ireland was continued for national purposes and as part of the input to ICES and the Oslo and Paris Commission programmes (FRC, Dublin).
2.
The monitoring of algal blooms was continued, and exceptional blooms were recorded off the south and west coasts. Shellfish from the affected areas were assayed for DSP and PSP toxins (cross refer to Mariculture Committee Report 1985) (FRC, Dublin).
3.
A brief survey of the organic industrial waste dumping ground off the south-west coast was carried out and included measurements of physicochemical parameters and nutrients (FRC, Dublin).
4.
Studies are continuing on the ecology of the benthos and sediments in Dublin Bay with respect to organic enrichment. Various physiological and bioassay techniques are being used to investigate the effects of pollution (Trinity College, Dublin).
5.
Radioactivity measurements were carried out on fish, seawater sediments and seaweeds sampled from coastal areas and from the Irish Sea, in particular (Nuclear Energy Board, Dublin).
6.
Work on fish and shellfish pathology as an indicator of degraded water quality conditions in Cork Harbour is continuing (University College, Cork)
7.
Intercalibration work: ICES 7th round intercalibration exercise for trace metals in biota (FRC, Dublin).

Netherlands

No report received

Norway

(L. Fjyn and P.T. Hognestad)

1. Field programmes

1.1 Investigations on the environmental qualities in the Skagerrak area in one section (Torungen-Hirtshals) between Norway and Denmark were carried out with 11 surveys throughout the year. Measurements were made of temperature, salinity, oxygen, nutrients and phytoplankton. (Flødevigen Biological Station).

1.2 To investigate the effect of sewage outlet in Tvedestrandsfjord, 4 surveys were carried out in 1985 at 4 stations measuring temperature, salinity, oxygen, nutrients and phytoplankton. In addition current meters worked continuously at 2 stations. (Flødevigen Biological Station).

1.3 Monitoring of the environmental qualities of selected Norwegian fjords from Stavanger to Varangerfjord were carried out. The fjords were selected to represent different types of environmental stress conditions; i.e. industrial and domestic load. Measurements: oxygen and turbidity. (Institute of Marine Research, Bergen).

1.4 Environmental quality of coastal sea water. This programme continued for the tenth season. The organic load of the Baltic current is being investigated from the Øresund through the Kattegat and Skagerrak and along the western Norwegian coast. Recordings are made of particulate matter, nutrients and temperature, whereas primary production indices are measured at intervals. (Institute of Marine Research, Bergen).

1.5 Within the framework of the State Pollution Monitoring Programme, sponsored and administrered by the State Pollution Agency, baseline and monitoring studies have been carried out

in about 12 coastal areas, most of them heavily polluted either from plant nutrients and easily degradable organic material and/or toxic substances (PAH, metals, fluoride, halogenated organics). The investigations have included standard hydrography. Surface water quality (transmission, chlorophyll a), shallow water and soft bottom community structure and registration of micropollutant levels in sediments and indicator organisms (mussels, snails, seaweeds). (Norwegian Institute of Water Research, Oslo).

1.6 Studies within the Joint Monitoring Programme under the auspices of the Oslo and Paris Commissions have been conducted in two fjords. (Norwegian Institute of Water Research).

1.7 Effects of drill cuttings on soft bottom fauna have been the subject of extensive field experiments. The seabed around oil platforms has been monitored. (Norwegian Institute of Water Research, Oslo).

1.8 The observations of background levels of micro pollutants and basic microbiological and chemical processes in the extremely stagnant and naturally anoxic basin Framvaren have continued. (Norwegian Institute of Water Research, Oslo).

1.9 Investigations have been performed in the marine environment in connection with outlet tunnels for sewage near Bergen. Recordings of pollution from fish farms have been made. (Institute of Marine Biology, University of Bergen).

1.10 Nutrient status of the Oslofjord plankton. A field programme was initiated in which physiological tests for nitrogen and phosphorus limitation are applied at the same time throughout the yearly phytoplankton growth cycle. (Marine Botany Section, University of Oslo).

1.11 Studies on recolonization, particularly by endobenthos, of oil contaminated sublittoral sediment. (Dep. Marine Zoology & Chemistry, University of Oslo).

1.12 Classification of soft bottom animal communities in inner Oslofjord and their relation to the state of pollution. (Dep. Marine Zoology & Chemistry, University of Oslo).

2. Laboratory assays

2.1 Quantitative descriptions have been made of littoral hard-bottom communities (macroalgae and invertebrates) in Troms and Finnmark, North Norway, from fully exposed to very sheltered localities. Structure and species composition have been related to environmental factors. (Institute of Biology and Geology, University of Tromsø).

2.2 Enzyme studies (Mixed function Oxidase) using flounders (Platichthys flesus) has been performed. (Institute of Marine Research, Bergen).

2.3 How environmental factors (light and nutrients) affect the growth rate of toxic dinoflagellates has been studied. (Trondhjem Biological Station & Institute of Marine Biochemistry, University of Trondheim).

2.4 Studies on recruitment, growth, sexual development and mortality of periwinkle (Littorina littorea) and the influence of long-time exposure to low concentrations of hydrocarbons. (Dep. Marine Zoology & Chemistry, University of Oslo).

2.5 Studies on the influence of oil contamination of recruitment, growth and mortality of the mussel (Mytilus edulis). (Dep. Marine Zoology & Chemistry, University of Oslo).

2.6 Experimental tank studies of biological and chemical responses to the settling of plankton and suspended oil drill cuttings on soft bottom. (Dep. Marine Zoology & Chemistry, University of Oslo).

2.7 Experimental studies on variation in genetic structure of populations of mussel (Mytilus edulis), periwinkle (Littorina littorea) and barnacle (Balanus balanoides) in oil contaminated water. (Dep. Marine Zoology & Chemistry, University of Oslo).

Poland

No report received

Portugal

(C. Lima)

Regular surveys of heavy metals (Hg and Cd) and PCB's has continued at five areas, in the framework of the Joint Monitoring Programme of the Oslo and Paris Conventions.

Baseline studies of mercury levels in fish and shellfish with commercial interest, along the Portuguese coast were continued. The study of mercury levels in several tissues of Aphanopus carbo from Madeira and continental waters has continued.

Chlorinated pesticides and PCB's in some fish, molusca and crustacean were studied.

Cd, Pb, Cu, Zn, Co, Ni, Cr, in fish, molusca and crustacean were also studied.

Prevalence of finfish and shellfish diseases related with pollution is recorded along the Portuguese coast.

The environmental study of the Tejo Estuary was continued. Assessment of the results obtained in previous years were done and particular effort had been devoted to publication of data and preparation of the future programmes in order to obtain a more comprehensive approach.

Radioactivity of deep water fish from Madeira and continental waters was measured.

The survey of the benthic fauna is continued in connection with the EEC Project Cost 47. Investigations of variation of dynamics and productivity of macrozoobenthos populations (Patella depressa, P.vulgata, P.aspera) were studied.

Environmental conditions in sea water off Portuguese coast in

connection with fisheries resources studies were carried out. T^a, salinity, oxygen, nutrients, pigments and primary production were measured.

Petroleum hydrocarbons were analysed in effluents from petroleum refineries, in surrounding coastal waters (Leixões, Aveiro, Lisboa, Sines and Faro) and in some organisms,

A study on the bathing water quality along the beaches near Lisboa and in the south coast was continued.

A regular bacteriological control of the shellfish (bivalves) culturing areas showed some problems related to water quality in few areas near urban outfalls in summer.

Special surveys were carried out to monitor the development of red tides in the outer Tejo Estuary (Cascais-Guincho). T^o, salinity, oxygen, pH, nutrients, suspended particulate matter, pigments, primary productivity, phytoplankton and zooplankton (respiration and excretion) were measured.

Sediments:

- Mobility of some elements as a results of anoxic/oxic conditions in sediments.
- Tentative of geochemical mass balance in estuaries.
- Studies about the bioavailability of trace metals in sediments.
- Transfer of metals from sediments to the living organisms.

Spain

(A. Alvarez-Meneses)

No report received, but list of publications is available in a separate document.

Sweden

(B.I. Dybern)

1. Monitoring. The Swedish national monitoring programme has been continued. Its marine part comprises a great number of stations along the coast and in the open sea. It is interconnected with the monitoring programmes of ICES and the Helsinki Commission.
2. Eutrophication in the marine environment and related problems. A number of investigations are being carried out both on the west coast and along the Baltic coast. Efforts to map and understand the spreading of toxic dinoflagellates on the west coast have been made. The relation P/N has been investigated in different parts.
3. Toxic substances in marine biota. Besides the abovementioned monitoring several big projects deal with the distribution and effects of toxic substances emanating from industries of various kinds, with special emphasis on cellulose factories.
4. Fish diseases in polluted environments. This project has been continued, partly in cooperation with similar projects elsewhere in northern Europe.
5. Cooling water effects from nuclear power plants have been monitored.
6. A number of regional investigations have been carried out in sensitive coastal areas along the coasts of the Gulf of Bothnia, the Baltic proper (especially in the County of Kalmar) and on the west coast. These investigations are mainly aimed at giving the regional administrators a basis for their planning activities.
7. Patchiness studies in the Baltic. Sweden has been the lead country in the ICES activities in this field.

United Kingdom

England and Wales.

(J.E. Portmann)

- C. Res 1980/4:7 The work reported as having been started in 1984 on the use of *Mytilus edulis* as a pathological indicator organism has continued at a number of sites around the coast. The use of this species is being supplemented by other biological effects investigations using other species.
- C. Res 1984/5:5
- C. Res 1981/4:6 A special investigation of the feasibility of using standard fish stock assessment cruises as a means of adding to the data base on the incidence of fish diseases was undertaken late in 1985. The area surveyed was the Irish Sea and a variety of fish diseases and abnormalities were observed. These did not appear to be particularly associated with areas known to be contaminated but the results of the survey are still being assessed.
- C. Res 1982/4:5
- C. Res 1982/4:6 Samples of fish and shellfish were collected as planned as part of the UK contribution to the 1985 baseline study of contaminants in fish and shellfish. Analysis of the samples has commenced.
- C. Res 1982/4:7 A report on inputs to coastal waters around the UK was submitted to ICES in 1985. This included estimates of pollutant inputs via rivers. Further investigations are now in progress to improve the accuracy of the data particularly in relation to inputs to the North Sea.
- C. Res 1982/4:10 An assessment of the status of the Irish Sea was commenced, in accordance with the guidelines recommended by ICES. Initially this is being undertaken as a UK exercise but the results will be submitted to the relevant ICES Working Groups during 1986 for expansion to a full international assessment.
- C. Res 1983/4:1 Investigations are continuing into the bioavailability of metals in dredge spoils and in sewage sludges. These are being pursued by a combination of field studies and laboratory investigations.
- C. Res 1984/4:3 A survey of trace metals, and total hydrocarbons, in sea waters around the coasts of England and Wales and in the adjacent shelf sea areas was commenced. This is to continue via two further research cruises in 1986. Samples are being collected at the reference stations suggested by ICES.
- C. Res 1985/4:15
- C. Res 1985/4:22 Work was undertaken and is continuing on the development and routine application of chemical methods for toxin identification and quantification in mussels affected by bloom organisms.

United States

(J.B. Pearce and C. Oviatt)

The following are reports on topics of interest to MEQC, ICES, as expressed in recent resolutions (1977-84). Obviously not all research and monitoring activities underway in the U.S. can be covered by this report. Numerous academic and state agencies are conducting such activities. Inquiries to the authors can aid in identifying the principal research groups involved in long-term monitoring and research in the Northwest Atlantic.

National Surveys and Assessments.

The NOAA National Status and Trends (NS&T) Program is conducted under the aegis of the Ocean Assessments Division of the National Ocean Service and is now beginning its third year. This is the only federal program currently measuring environmental quality conditions throughout coastal and estuarine areas of the USA. The program conducts two major projects, the NOAA "Mussel Watch" and the "Benthic Surveillance Project". At 150 sites around the US, bivalve molluscs (mussels or oysters) are collected, along with nearby fine-grained surface sediment once per year and analyzed for several trace metals as well as PAHs, PCBs, DDTs and other organochlorine pesticides. The first national collection will be complete in April, 1986 and the resulting data available in early 1987. At 50 sites, benthic-feeding fish and associated sediments are collected annually and analyzed for the same chemicals. In addition, incidence of fish disease, as determined from patent external or histopathological lesions, is being measured. A third collection began in March, 1986 and will be completed by October, 1986. Data from the 1984 collection are undergoing initial evaluation and generally will be available in late 1986. (NOAA National Ocean Service, N/OMA32, Rockville, Maryland).

Since 1979, the Ocean Assessments Division has been organizing and synthesizing the best available information on important characteristics of coastal areas and the Exclusive Economic Zone of the USA. The information is assessed on a national "strategic" sale to: 1) recommend objectives for coastal and oceanic resource development and conservation, 2) identify various means to achieve these objectives, and 3) evaluate the potential effects of their implementation. A major product of each assessment is a data atlas of thematic maps of important characteristics. Four regional assessments and companion atlases represent the principal focus of the effort: (1) East Coast; (2) Gulf of Mexico; (3) Bering, Chukchi, and Beaufort Seas; and (4) West Coast and Gulf of Alaska. In addition, two national-level assessment projects are underway: (1) National Status of the Health and Use of the Coastal Waters

of the USA; and (2) National Estuarine Atlas. Through these thematic atlases, diverse information is brought together and made available immediately to those who manage or exploit coastal and ocean resources. (NOAA National Ocean Service, N/OMA31, Rockville, Maryland).

Federal Survey of PCBs in Atlantic Coastal Bluefish.

The National Marine Fisheries Service (NMFS) was requested by the U.S. Congress to conduct a Federal survey of PCBs in Atlantic Coastal Bluefish. This research program was conducted to determine the nature and scope of the problem and any associated health risks. This two-year Federal Survey was coordinated by NMFS, in cooperation with the Food and Drug Administration and the Environmental Protection Agency. A data report will be provided to Congress and the states in April, 1986. A final interpretive report will be available in December, 1986. (R. R. Kifer, NMFS, F/S3).

Biological Effects Studies.

The effects of PCBs on growth and reproduction of the American lobster, *Homarus americanus*, are being studied by the Northeast Fisheries Center (NEC). Egg-bearing lobsters are being collected from areas heavily contaminated with PCBs. The eggs are hatched in the laboratory and compared to eggs hatched from females collected in PCB-free areas. To date, egg production, egg hatchability, larval growth, larval survival, and larval molting success have been evaluated. Juvenile survival and growth will be evaluated in the coming year. (NMFS, Milford Laboratory)

Histopathological studies of hepatic tissues of winter flounder, *Pseudopleuronectes americanus*, from degraded coastal environments have disclosed a variety of non-neoplastic, pre-neoplastic and neoplastic lesions. Flounder from PCB-contaminated areas have high levels of hepatic parenchymal cell necrosis and other inflammatory lesions. Flounder from PCB, PAH-contaminated areas have high levels of inflammatory and neoplastic lesions. Non-neoplastic lesions in these flounder include hepatitis, pericholangitis and hypertrophy and hyperplasia of melano-macrophage aggregates. Pre-neoplastic and neoplastic lesions include basophilic foci, hepatocellular adenoma and hepatocellular and cholangiocellular carcinoma. (NMFS, Oxford Laboratory).

The use of melano-macrophage aggregate hypertrophy and hyperplasia in kidney, liver, and spleen as an indicator of pollutant stress is being evaluated. Preliminary data from winter flounder suggest that livers of flounder collected from polluted coastal environments have larger and more numerous melano-macrophage aggregates. Studies of the amounts of three metabolically derived pigments - ceroid, iron and melanin - in these melano-macrophage aggregates suggests that they are

unequally distributed in flounder from clean and polluted environments. These studies will be refined to evaluate the role of age, sex and maturity stage on hepatic melano-macrophage aggregates. (NMFS, Oxford Laboratory).

The abundance and distribution of gross external lesions and anomalies of 10 commercially valuable Northwest Atlantic bottom fish species was completed. In a 5-year period, 84,745 fish were examined during the conduct of seasonal fish stock assessment cruises. Overall occurrence of six abnormal conditions in eight geographic areas on the continental shelf was 1.2%. Flatfishes were more often diseased than other fish species and one disease, fin erosion, was more prevalent in nearshore environments than offshore ones in five of the seven flatfish species examined. (NMFS, Oxford Laboratory).

The effects of water quality in Long Island Sound (Connecticut, New York) on reproductive success of the winter flounder, Pseudopleuronectes americanus, are being studied by the NEC. Flounder have been collected from seven stations in the Sound. These stations represent a gradient of water quality from clean to polluted conditions. Eggs are fertilized in the station water and an evaluation is made of the hatching success, survival and growth of larvae, as well as a determination of normal development through genetic and histological evaluations. (NMFS, Milford Laboratory).

The effects of disposal of contaminated dredged materials on American lobsters, Homarus americanus, are being studied by the Northeast Fisheries Center. Heart rate and gill bailer activity are monitored as sensitive indicators of water quality. Lobsters produce single pulse ventilatory reversals with much higher frequency when exposed to water-borne chemicals. Lobsters held in cages near the dumping site, or held in aquaria containing dredge spoil, exhibit higher numbers of ventilatory reversals. Heart and gill bailer rates are also altered after exposure to contaminated dredge spoils. (NMFS, Milford Laboratory).

Contaminant research at Beaufort Laboratory, Southeast Fisheries Center (SEC), is primarily concerned with determining the chemical and biological processes that control the availability, accumulation, and toxicity of trace metals (i.e., Cd, Cu, Mn, and Zn) to coastal and estuarine fishery organisms. The investigations of the impacts of trace metals on estuarine fishery organisms was expanded in 1985 to include not only the effects of food web organisms that support the survival and growth of larval fish, but also the development of techniques that can be utilized in determining the potential for trace metal toxicity in natural waters; studies combine laboratory and field efforts and have involved different estuaries from the northeast Atlantic to the southwest Gulf of Mexico.

The laboratory phase of our research has been devoted to defining the chemical and biological mechanisms of trace metal

toxicity to important zooplankton species. The primary organism used in these studies has been the copepod, Acartia tonsa, which is the major food item for many larval fish species. Copepods from Beaufort were exposed to water collected from "polluted" estuaries along the Atlantic and Gulf of Mexico coast. When the chelating agent (EDTA) was added to water samples, it reduced toxicity in some instances, indicating that dissolved metals may affect fishery organisms inhabiting the area. Similar experiments were done with the eggs of the bay anchovy, Anchoa mitchilli; overall results were the same.

The field portion of our metals investigations is associated with the Status and Trends Program, NOAA. Investigators at the Beaufort Laboratory, Charleston Laboratory, and the Northeast Fisheries Center, Oxford Laboratory, are measuring and examining fish livers (croaker and spot) and sediment samples for concentrations of metals, synthetic organics and petroleum hydrocarbons, as well as for histopathological abnormalities in livers. Currently samples of fish liver and sediments are being measured for concentrations of metals at the Beaufort Laboratory and for organic contaminants at the Charleston Laboratory.

Another portion of our research is concerned with the physiological functions of the low molecular weight, sulfur containing, metal-binding protein, metallothionein in fishery organisms. This low molecular weight protein has been shown to be present in all organisms that have been examined. In addition, the reproductive cycle of oysters and the molt cycle of blue crabs have been shown to affect the distributions of copper and zinc at both the tissue and biochemical level.

Potential impacts of OTEC development, hypoxia and nutrient overenrichment, and effects of excessive freshwater inflow on fishery communities also were examined. OTEC simulation experiments were conducted to evaluate the effects of cold water discharges on survival of tropical marine fish. At temperatures below 15°C mortality became significant and reached 100% at 10°C; significant behavioral changes also occurred at sub-lethal temperatures. An investigation of the vertical distribution and abundance of fish larvae at two potential OTEC sites in the Caribbean Sea showed that there appears to be considerable structure in the vertical distribution of larval fishes from the tropics. Therefore, the location of OTEC warm water intakes could have a considerable impact on the number and species of larvae subjected to both primary and secondary entrainment. Members of our staff participated in cooperative research/monitoring programs with the NMFS Sandy Hook Laboratory and with Louisiana Universities Marine Consortium, and analyzed samples from both coastal New Jersey and an hypoxia event in the northern Gulf of Mexico. These two areas have been designated priority hypoxia areas because of the potential threat to major fisheries by serious oxygen depletion.

Several projects focused on developing ecological models. Modeling efforts dealing with the impact of excessive

freshwater inflow on distribution of fishery related organisms were carried out. Another modeling effort dealt with wetland losses, and attempting to relate marsh disintegration and marsh edge with fisheries abundance in Louisiana. Also, a mathematical model of fishery stock dynamics was developed that incorporated hypothetical, contaminant-induced losses of pre-recruit life stages. Using a Leslie matrix approach, contaminant effects were modelled as either acute or chronic changes in the survival rate during the first year of life (S_0). Density dependent and independent models were applied to menhaden, mackerel, striped bass and other important harvested species. Pollution induced changes in population size were simulated by fractional reductions in survival due to degradation in habitat quality and area. The results show probability and magnitude of population losses imposed by pollution. (NMFS, Beaufort Laboratory).

The Northeast Monitoring Program (NEMP) is completing its report on the first five years of activities. These included measurements of water column phenomena (chlorophyll, primary production, nutrients, etc.), contaminants in organisms (body burdens) and biological effects (biochemical, behavioral, ecological community, genetic, pathological and physiological). Based on these findings, the Northeast Fisheries Center is emphasizing continued research and monitoring in inshore (coastal) and estuarine waters, with reduced temporal frequency of monitoring at outer shelf sites.

Benthic macrofauna communities sampled semiannually between 1978 and 1984 for the Northeast Monitoring Program appeared to be stable over time. According to several measures (numbers of species and amphipod species, dominant species, cluster analysis), stations on the middle and outer shelf underwent little faunal change over the monitoring period. Since sediment contaminant concentrations at these stations were low, the program's emphasis has now changed toward inshore, more contaminated areas. The most contaminated stations sampled, near dumping grounds in the New York Bight, had lower numbers of species and amphipods, clustered separately from the offshore stations, and were dominated by species known to be opportunistic and pollution tolerant. These areas were relatively stable, in terms of sediment metals, bacterial densities and benthic macrofauna community structure, between 1973 and 1984. (NMFS, Sandy Hook Laboratory).

Benchmarks.

The NJ Department of Environmental Protection released a report on dioxin in habitats (sediments) and tissues from aquatic animals. Levels of this contaminant in habitats and tissues led the State of New Jersey to conduct risk assessments in regard to the human health implications of consuming certain marine and estuarine species. Further monitoring is proposed for selected coastal waters and species. (N.J. DEP, Office of Science and Research).

Behavioral Effects

Changes in behavior induced by exposure to contaminants or other anthropogenically related factors can lead to decreased survival for a variety of marine organisms. Under laboratory exposure to oiled sediment at levels which were sublethal but environmentally relevant, certain benthic polychaetes (Nereis virens, Glycera dibranchiata); bivalve molluscs (Mercenaria mercenaria, Protothaca staminea) and sand lance, Ammodytes hexapterus, exhibited altered burrowing and emergence which could decrease survival by increasing predation vulnerability. When exposed to high levels of cadmium-contaminated sediment, however, the two polychaete species, including a third, Nephtys caeca, showed no alterations in burrowing or emergence which might have mitigated exposure. There were marked differences in the rate of cadmium uptake by these polychaetes which could pose a potential threat in terms of food chain transfer to predators, e.g., crustaceans, fishes, birds. In contrast, the infaunal amphipod, Rhepoxynius abronius, was sensitive to cadmium-contaminated sediment which may indicate that portions of phoxocephalid populations may exhibit behavioral avoidance of toxic sediments.

Other environmental perturbations which have the potential for affecting marine resources include the occurrence of hypoxia/anoxia in coastal waters. Under laboratory conditions, a demersal finfish species, Urophycis chuss, showed changes in activity, movement into the water column, depressed feeding and altered social interactions under decreasing levels of DO. The extent of the response was related to age/size with younger, smaller fish apparently the most sensitive. While avoidance of low DO might be successful, survival probability could be reduced by movement of the fish into areas where critical habitat requirements such as shelter availability are not met. (NMFS, Sandy Hook Laboratory).

U.S.S.R.

No report received

APPENDIX 1

Appendix 1 includes those returns received from member nations with regard to amounts of sand and gravel extracted during 1984 and 1985.

Reports were received from the following countries :

Belgium
Canada
Finland
Iceland
Portugal
England and Wales
USA

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985

COUNTRY ... Belgium

ISSUING AUTHORITY ... Ministry of Economic Affairs

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	0,502	0,753	Kwinte Bank
GRAVELS	2.0 mm-6.4 cm			Buiten Ratel Gostdyckbank
PEBBLES COBBLES	> 6.4 cm			
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985

COUNTRY CANADA

ISSUING AUTHORITY North of 60° is Dept. of Indian and Northern Affairs

REPORTING PERIOD (IF DIFFERENT FROM ABOVE)

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	2.5		Beaufort Sea and
GRAVELS	2.0 mm-6.4 cm			Offshore Western Canada
PEBBLES/CORBLES	> 6.4 cm			
CALCAREOUS SHELL LITHOTHAMNION OTHER (SPECIFY)	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

IMPACT ON FISHERIES

A CURRENT PRODUCTION Briefly specify the types of problem encountered as a result of aggregate production during the reporting period (if any) Nothing in past year.

B FUTURE PRODUCTION Detail the quantity, type and location of any proposed marine mining activity likely to be of international fisheries interest or concern

Notes:

As the majority of Canadian marine aggregate production is in support of offshore oil and gas exploration and development, the status of the latter will determine future aggregate production.

All Canadian aggregate production takes place in waters subject to Canadian jurisdiction.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985

COUNTRY Finland

ISSUING AUTHORITY National Board of Waters

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm			
GRAVELS	2.0 mm-6.4 cm	<0.5		Gulf of Finland
PEBBLES/COBBLES	> 6.4 cm			
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985....

COUNTRY ..Iceland.....

ISSUING AUTHORITY Marine Research Institute

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	0.365		Faxa Bay
GRAVELS	2.0 mm-6.4 cm	0.243		Faxa Bay
PEBBLES/COBBLES	> 6.4 cm			
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES	0.105		Faxa Bay

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1995

COUNTRY PORTUGAL

ISSUING AUTHORITY INstituto Geológico

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	4.9		Alentejo, Beja, Faro, Lagos, Leiria, Lisboa, Madeira, Setúbal, Vila Real, Açores, Madeira, Açores
GRAVELS	2.0 mm-6.4 cm	0.002		Alentejo
PEBBLES/COBBLES	> 6.4 cm	0.006		Faro
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1984

COUNTRY UK (ENGLAND AND WALES)

ISSUING AUTHORITY CROWN ESTATE OFFICE

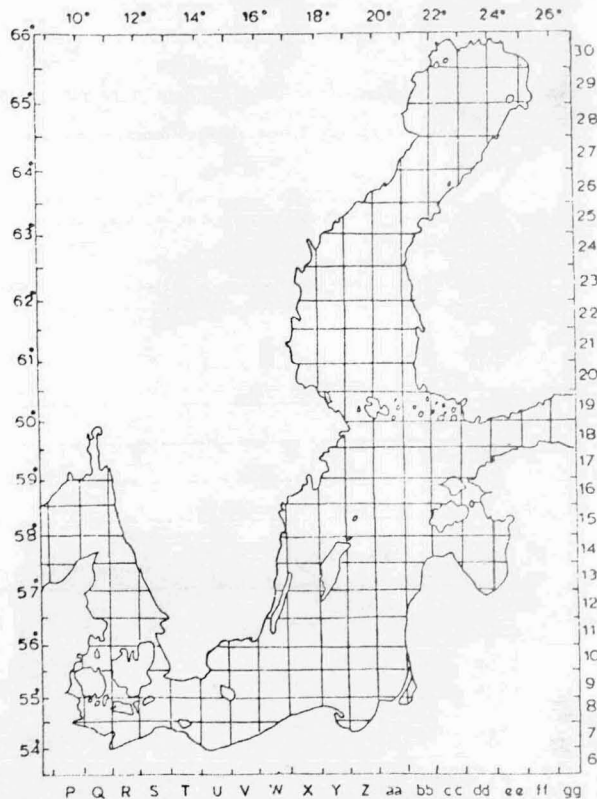
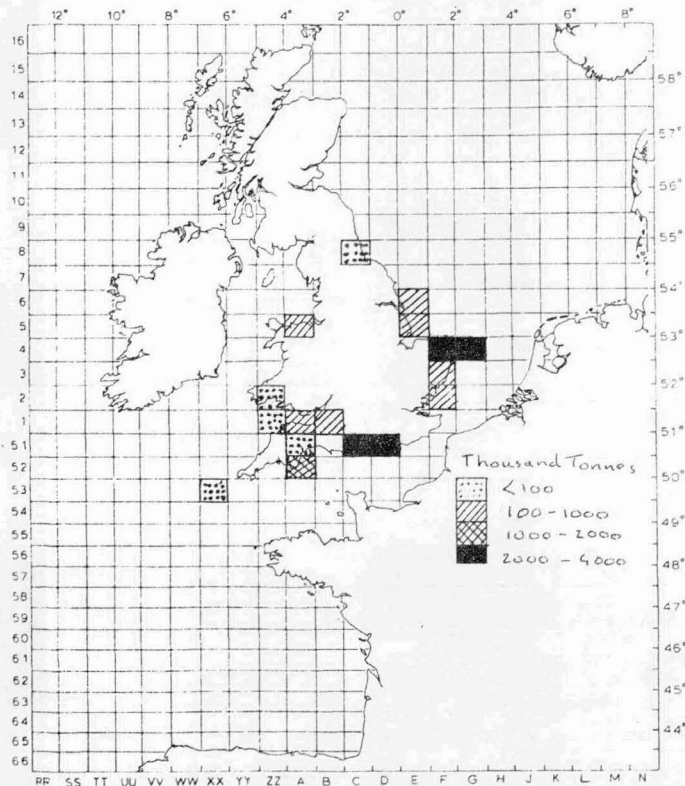
REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	10.5*	16.2	A1, A2, A5, A51, B2
GRAVELS	2.0 mm-6.4 cm			C8, C51, D51, E5, E6
PEBBLES/COBBLES	> 6.4 cm			F2, F3, F4, G4, XX53, ZØ1, ZØ2
CALCAREOUS SHELL LITHOTHAMNION ✓ OTHER [SPECIFY]	ALL SIZES		<1 (700 T)	XX53

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

* Approximate, calculated using a denisity of 1.53.

MARINE AGGREGATE EXTRACTION ENGLAND AND WALES 1984



REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1984...

COUNTRY United States of America

ISSUING AUTHORITY U. S. Army Corps of Engineers

REPORTING PERIOD (IF DIFFERENT FROM ABOVE)

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	0.21	0.26	Ambrose Channel-New York Harbor
GRAVELS	2.0 mm-6.4 cm	0.04	0.05	same
PEBBLES/CORBLES	> 6.4 cm	—	—	—
CALCAREOUS SHELL LITHOTHAMNION OTHER (SPECIFY)	ALL SIZES	—	—	—

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

IMPACT ON FISHERIES

- A CURRENT PRODUCTION Briefly specify the types of problem encountered as a result of aggregate production during the reporting period (if any) No significant adverse impact on the fishery resources of New York Harbor or the New York Bight is anticipated.
- B FUTURE PRODUCTION Detail the quantity, type and location of any proposed marine mining activity likely to be of international fisheries interest or concern
No proposed mining activity in the New York Bight area should impact international fishery resources.

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985

COUNTRY United States of America

ISSUING AUTHORITY U.S. Army Corps of Engineers

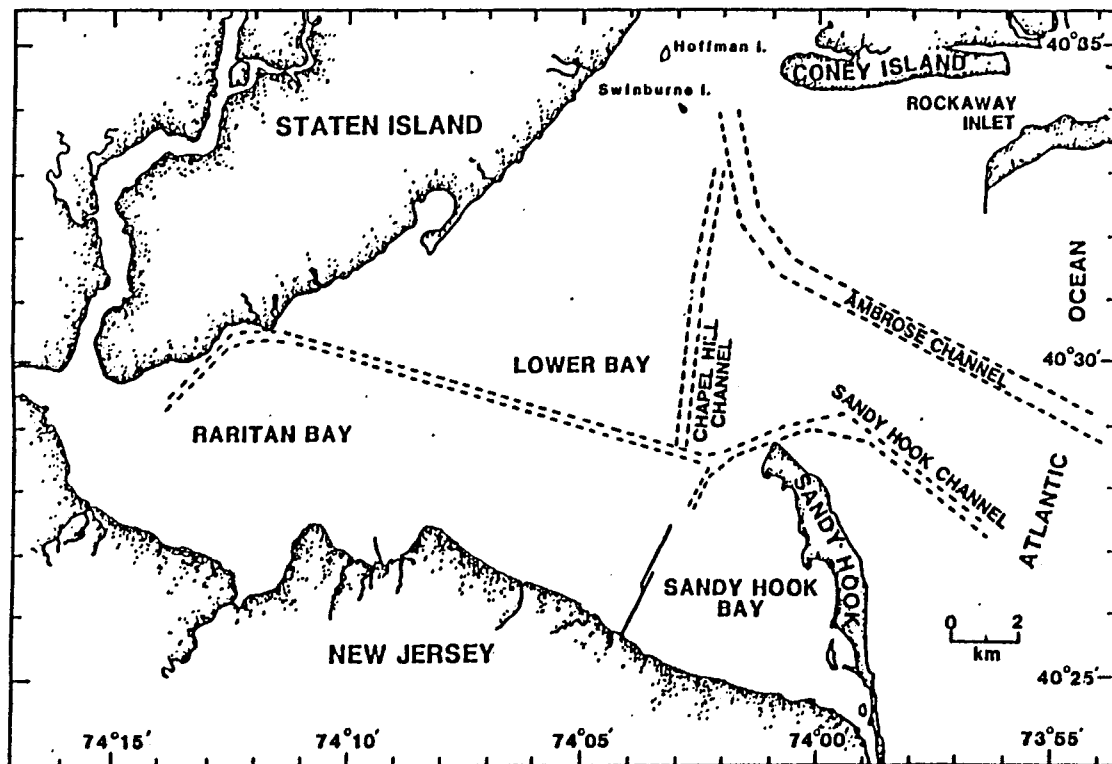
REPORTING PERIOD (IF DIFFERENT FROM ABOVE)

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm	0.69	0.83	Ambrose Channel-New York Harbor
GRAVELS	2.0 mm-6.4 cm	0.11	0.13	Same
PEBBLES/CORBLES	> 6.4 cm	—	—	—
CALCAREOUS SHELL LITHOTHAMNION OTHER (SPECIFY)	ALL SIZES	—	—	—

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

IMPACT ON FISHERIES

- A **CURRENT PRODUCTION** Briefly specify the types of problem encountered as a result of aggregate production during the reporting period (if any). No significant adverse impact on the fishery resources of New York Harbor or the New York Bight is anticipated.
- B **FUTURE PRODUCTION** Detail the quantity, type and location of any proposed marine mining activity likely to be of international fisheries interest or concern.
No proposed mining activity in the New York Bight area should impact international fishery resources.



FINLAND

(P. Kangas & P. Tulkki)

Monitoring studies on the pollution of the open Baltic Sea areas have been continued on a routine basis according to the program of Helsinki Commission and national programs. The monitoring of the Gulf of Bothnia and Gulf of Finland is performed according to bilateral conventions with Sweden and the USSR, respectively. In addition, there are a coastal water program and several local pollution control programs supervised by the water authority.

Transport of nutrients, metals and organic matter has been measured on a routine bases in the lower courses of all major rivers. The retention of nutrients, suspended matter and organic matter in the coastal zone has been studied off one large river discharging to the Gulf of Finland. The behaviour of phosphorus transported by rivers has been studied in a bay in southwestern Finland. A study of reasons for high nitrogen content in the Bothnian Bay has been started.

Finland has participated in the ICES Baseline Study on Contaminants. Fish and selected benthic animals for analyses have been sampled from the Gulf of Bothnia, Gulf of Finland and northern Baltic Proper.

Studies on harmful substances have been continued by measuring concentrations of lindane, DDT, PCB, Zn, Cd and Pb in sea water. Heavy metal content in sediments has been studied in collaboration with GDR.

The preparatory work on the ICES/SCOR Baltic Sea Sediment Studies continued. A map on the potential sedimentation basins and the rate of sedimentation in these basins has been under preparation.

Impact of an oil spill in 1984 on avifauna, littoral and benthic communities, as well as on fish and fisheries has been studied in the Quark area of the Gulf of bothnia. Another oil impact study was started in the Åland Sea, where some 250 t of heavy oil is lying on the bottom at an unknown locality.

A series of studies has been carried out in the Bothnian Sea to observe effects of a TiO_2 industry. In 1985 12 different studies has been going on.

Effects on sand and gravel extraction has been studied in the Gulf of Finland. Research on currents, water quality, benthos, fish and fisheries have been carried out during an experimental sand extraction in 1985.

Studies on recovery potential of a number of disturbed coastal

water areas have been continued. The research on littoral changes during the 1970's and early 1980's has also been continued. During the last years a recovery of littoral communities has been taking place.

Studies on the effects of the rapidly increasing fish cultures on the coastal marine environment have been going on in the archipelago of the southwestern Finland.

Results of the 6th Symposium on the Gulf of Finland, held in Pärnu in 1981, have been published in the USSR. The volume contains 22 articles concerning the bioindication of the ecological condition of the Gulf of Finland.

International Council for the
Exploration of the Sea

C.M. 1986/E:1
Report of Activities

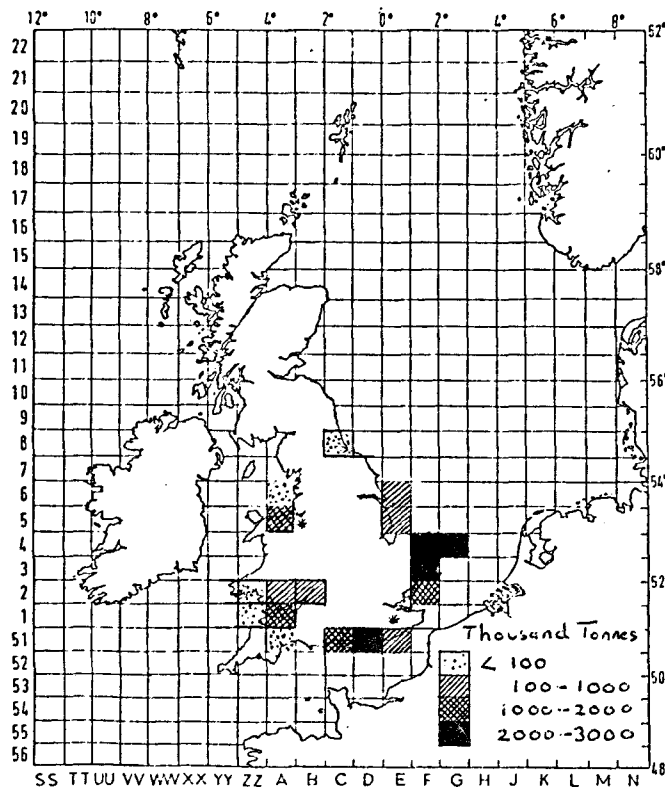
APPENDIX III

SAND AND GRAVEL EXTRACTION RETURNS

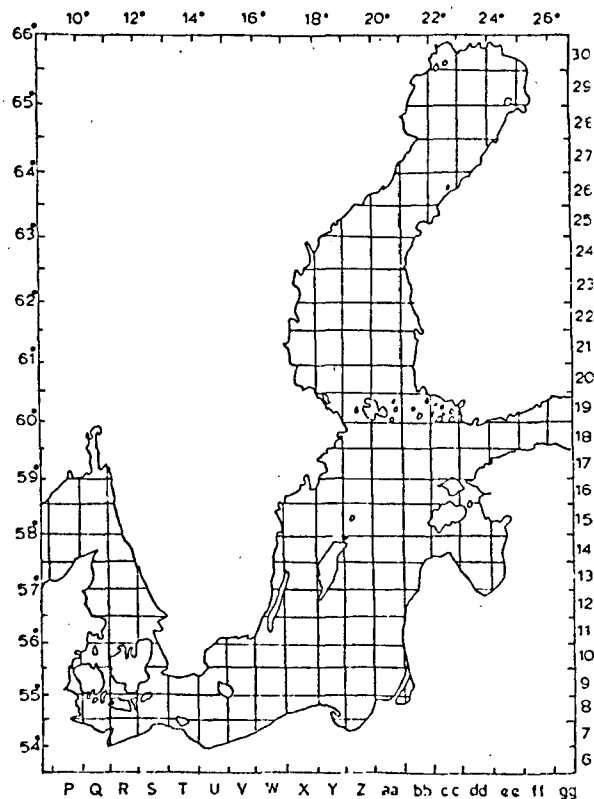
England and Wales

1985

MARINE AGGREGATE EXTRACTION ENGLAND AND WALES 1985



* Include aggregate extracted for reclamation, see sheet 6 for details



ICES FISHERIES IMPROVEMENT COMMITTEE

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985 (a) Aggregate extraction for use on land.

COUNTRY UK (England and Wales)

ISSUING AUTHORITY CROWN ESTATE OFFICE

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm)) A1, A2, A5, A6, A51, B2
GRAVELS	2.0 mm-6.4 cm) 10.8*	16.5) C8, C51, D51, E6, E7,
PEBBLES/COBBLES	> 6.4 cm)) F2, F3, F4, G4, ZZ1, ZZ2
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

* Approximate, calculated using a density of 1.53.

IMPACT ON FISHERIES

A CURRENT PRODUCTION Briefly specify the types of problem encountered as a result of aggregate production during the reporting period [if any]

B FUTURE PRODUCTION Detail the quantity, type and location of any proposed marine mining activity likely to be of international fisheries interest or concern

ICES FISHERIES IMPROVEMENT COMMITTEE

REPORT ON MARINE AGGREGATE PRODUCTION FOR YEAR 1985 (b) Aggregate extraction for reclamation.

COUNTRY UK (England and Wales)

ISSUING AUTHORITY CROWN ESTATE OFFICE

REPORTING PERIOD [IF DIFFERENT FROM ABOVE]

TYPE OF MATERIAL	SIZE RANGE*	TOTAL PRODUCTION		LOCALITIES (See overleaf)
		million m ³	million tonnes	
SANDS	0.063-2.0 mm)		
GRAVELS	2.0 mm-6.4 cm) 1.0*	1.5	A5, E51.
PEBBLES/COBBLES	> 6.4 cm)		
CALCAREOUS SHELL LITHOTHAMNION OTHER [SPECIFY]	ALL SIZES			

*The size ranges shown here are idealized, and are intended merely as a guide to the type of categorization required.

* Approximate, calculated using a density of 1.53

IMPACT ON FISHERIES

A CURRENT PRODUCTION Briefly specify the types of problem encountered as a result of aggregate production during the reporting period [if any]

B FUTURE PRODUCTION Detail the quantity, type and location of any proposed marine mining activity likely to be of international fisheries interest or concern