



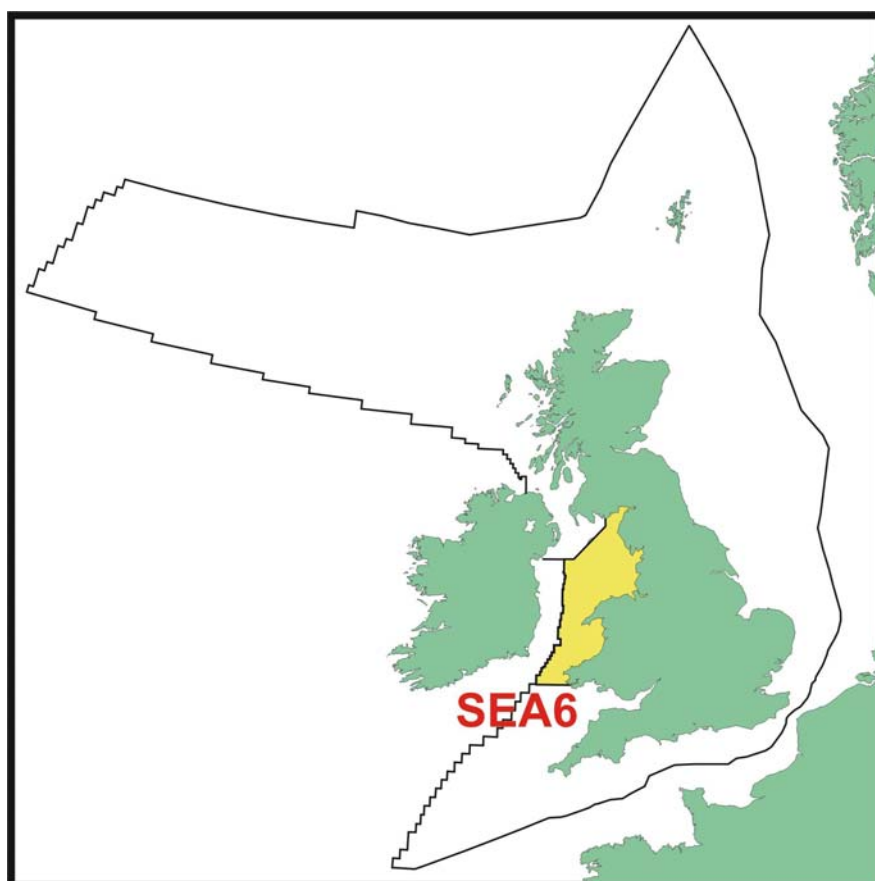
**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

DTI Strategic Environmental Assessment Area 6 (SEA6) Contamination of Water and Sediments Metadata

Continental Shelf & Margin Programme

Commissioned Report CR/02/280N



BRITISH GEOLOGICAL SURVEY

COMMISSIONED REPORT CR/02/280N

DTI Strategic Environmental Assessment Area 6 (SEA6) Contamination of Water and Sediments Metadata

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DTI Contract number SEA678_data_01

BGS Project number ERE73900467

Key words

Irish Sea, contaminants,
sediments, water, metadata

Front cover

SEA6.

Bibliographical reference

RIDGWAY, J, ROWLATT, S,
JENKINS, G, ROWLANDS, K,
SLATER, M. 20012. DTI
Strategic Environmental
Assessment Area 6 (SEA6)
Contamination of Water and
Sediments Metadata. *British
Geological Survey
Commissioned Report,
CR/02/280N*

Acknowledgements

In addition to the authors, many BGS and CEFAS staff contributed references to the database and their contribution is gratefully acknowledged. Dr P. D. Jones, of the Environment Agency, kindly made available his own database of work on the Mersey Estuary and Liverpool Bay.

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1 Introduction

This report describes work carried out under commission to the Department of Trade and Industry to compile an inventory of metadata on contamination of water and sediments for Strategic Assessment Area 6 (SEA6). The area concerned is shown in Figure 1 and essentially covers the eastern Irish Sea. In accordance with the contract conditions, the database has been compiled in EndNote© 6 format and produced on a compact disc. It is largely based on the contractors' experience of work on contamination in the Irish Sea backed up by extensive on-line literature surveys and information from personal contacts. For a naturally occurring element or compound, contamination can be defined as its presence at a concentration above the natural background level. This background level will itself vary with geological and/or oceanographic conditions and the metadata assembled will thus include papers and reports that give general geochemical data as well data on specific contamination. For synthetic substances, any presence can be regarded as contamination.

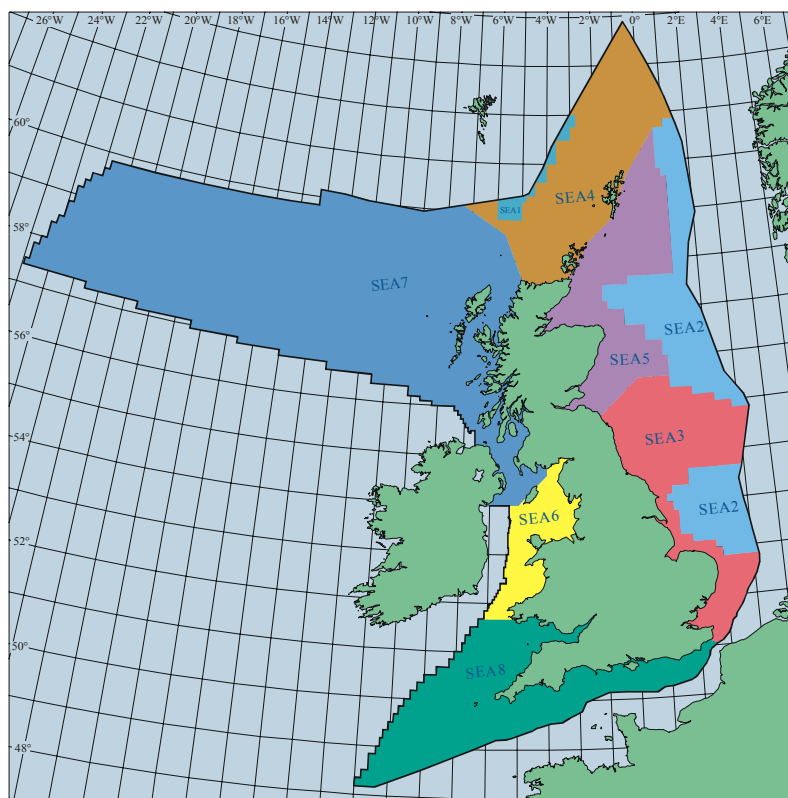


Figure 1 Division of sea areas for strategic environmental assessment

2 Synopsis

The Irish Sea, in particular the north-eastern Irish Sea, has been the focus of many studies of geochemistry and contamination, largely because of the concentration of industries in northern England, west of the Pennines, and the presence of the Sellafield nuclear processing plant on the Cumbrian coast.

Contamination of water and sediments

A relatively recent summary of organic, inorganic and radionuclide contamination in sediments from the Irish Sea can be found in Jones et al. (1999), in which details of major surveys are given and sources of contamination are discussed. A further BGS report, based on new data for the north-east Irish Sea, is in preparation. Relevant estuarine and offshore geochemical datasets for Irish Sea sediments are also detailed in Ridgway et al. (2001). Although some 29 geochemical studies of sediments were carried out in the Irish Sea region between 1964 and 1997 there are significant problems of compatibility in terms of the size fraction, chemical extraction method and analytical technique used, and also in the range of elements determined.

Three surveys, which employed the same sampling and analytical techniques, are of particular value in giving an overall picture of sediment geochemistry for SEA6: the OSPARCOM baseline survey of 1990-91 (OSPARCOM, 1994), covering the whole of SEA6; the NRA estuarine survey of 1995; and the National Monitoring Programme (NMP) survey of 1997-98. Sediment samples were collected at the stations, the locations of which are depicted in Figure 2, which shows the total coverage of the three surveys. Most samples from the initial OSPARCOM survey were collected between May 1990 and December 1991 from the MAFF ships RV CORYSTES and RV CIROLANA. Samples from the NRA survey were collected in 1995. Samples in the NMP survey were collected in 1997/98 from MAFF ships. These surveys all used 'total' extraction techniques on the < 2 mm fraction of surface sediments, but determined only a limited range of elements (Al, Li, Cd, Cr, Cu, Hg, Pb and Zn). The methodology followed International Council for the Exploration of the Sea (ICES) advice (ICES, 1989). Data from these surveys are available from CEFAS (address in accompanying database).

For waters, radionuclides and organic contaminants there are no comprehensive recent surveys covering the whole of SEA6. The most recent survey of waters for the whole of SEA6 was carried out between 1985 and 1987 under the auspices of ICES and the Joint Monitoring Programme (JMP). The data on Cd, Cu, Pb, Hg and Zn, are held in the ICES database. A survey carried out in 1991 and 1992 at a limited number of sample stations in SEA6, based on NMP sites, is reported in Laslett (1995) and Law et al. (1994). NMP surveys sample the stations shown in Figure 2 on a regular basis and provide useful data on a range of contaminants in waters and sediments. References to these studies can be found in the database accompanying this report, mostly under Franklin and/or Jones or Law and co-workers.

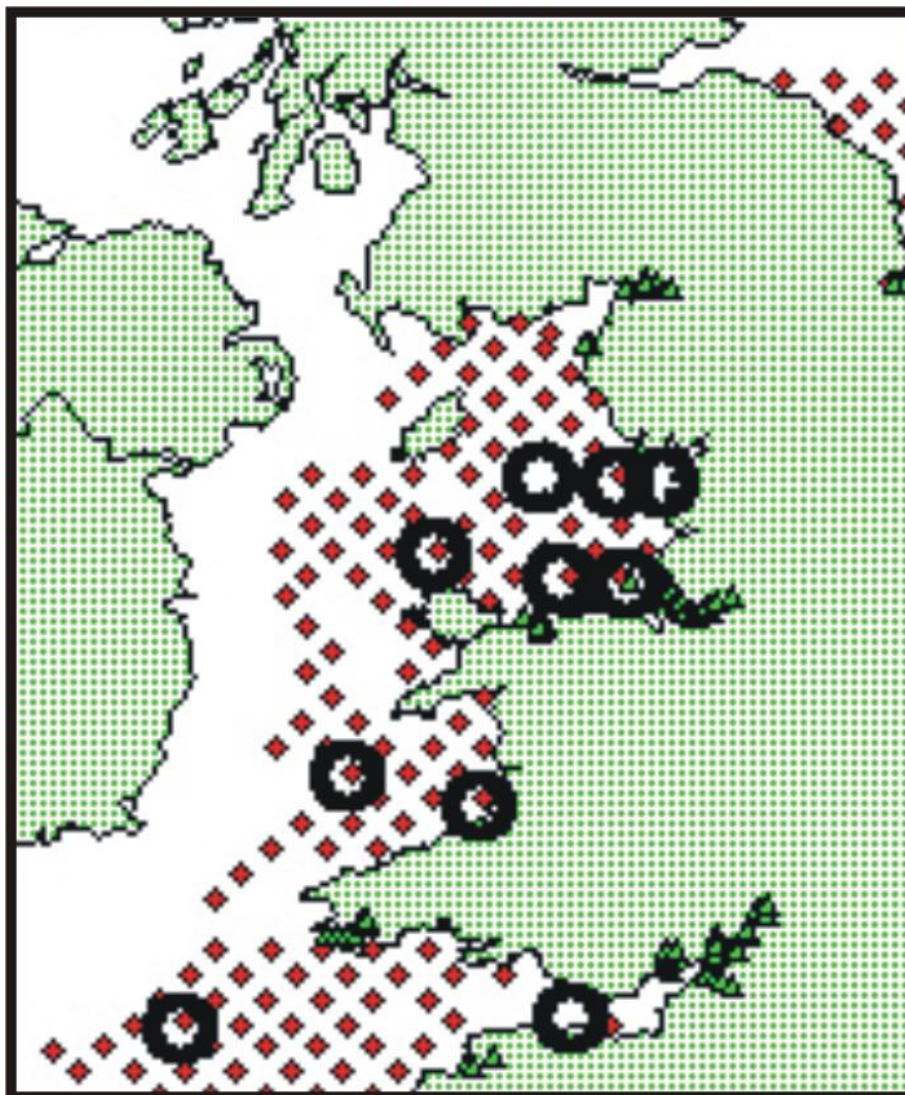


Figure 2 Sample stations OSPARCOM (red diamonds), NRA estuary (green triangles) and NMP (open circles) surveys mentioned in the text.

3 Methods

Along with previously accumulated personal EndNote and bibliographic data sets, five online databases were searched in order to compile the inventory. Although this report deals with contamination in SEA6, the contractors were also involved in compiling inventories of both contamination and geology for SEA7 and SEA8. To avoid duplication of effort searches were carried out to cover both subjects and all three areas and the retrievals later sorted into separate EndNote libraries for geology and the contamination of water and sediments in sea areas 6, 7 and 8. Searches were carried out on the basis of geographical and subject matter keywords (see 2.1 below)

Web of Science, GeoRef, GeoArchive, Zetoc and Aslib bibliographic databases were searched for journal, thesis and other references. Each search was repeated with all five databases, because they appear to hold slightly different collections of references.

The **Web of Science** online data set provides web access to ISI Science Citation Index, Social Sciences Citation Index, Arts and Humanities Citation Index, and Index to Scientific and Technical Proceedings.

The **GeoRef** online database, established by the American Geological Institute, has 1.9 million bibliographic references across all geological subject areas. The North American literature has been indexed from 1785 onwards, and other areas from 1933. Journal articles, books, conference volumes, reports, maps etc are all covered. It is particularly good for searches of the geological journal literature

GeoArchive is an online bibliographic database covering all types of information sources in geoscience, hydroscience, and environmental science. The database is produced by Geosystems (UK) and is provided online by Oxmill Publishing.

Zetoc provides Z39.50 compliant access to the British Library Electronic Table of Contents. It covers the 20 000 most heavily-requested journal titles from the British Library, and 16 000 conference proceedings per year. It contains 15 million items and is updated daily. Items are added within about 3 days of receipt. The database covers from 1993 onwards.

Aslib, consists of bibliographic records with abstracts, where available, for UK theses of all types and subjects. It covers theses accepted from years 1970 to 1999 and is the online equivalent of the printed index from volume 21 to 48 and parts 1-3 of volume 49.

EndNote has inbuilt import filters for Web of Science and GeoRef and, using the import filter manager, completed searches from these databases load easily and straightforwardly into EndNote, after downloading and saving as text or word documents. For GeoArchive it was necessary to create an EndNote import filter, which was then saved within the EndNote program filter collection to enable successful imports of the saved, tagged, word documents downloaded from searches. Zetoc was searched from within the EndNote programme using the 'connect and search' function, enabling references to be loaded straight into the EndNote library ready for manual filtering of relevant material. Individual records retrieved from the Aslib database were copied and pasted into a separate document to enable manual entry into the relevant EndNote library.

An EndNote output style was created to provide output in the same format as that specified in the contract for an Excel spreadsheet. Thus in the Notes section of the output: a. gives the location of the data (if known); b. shows whether the data is considered to be essentially free or to entail some cost; c. gives an estimate of the quality of the data; d. provides latitude and longitude limits for maps; and e. contains additional information which might be useful. In the Notes, journal articles, books and book sections are generally considered to be free and the data quality to be high (ranked 3 or higher). Unless there is some departure from this assessment these entries have no specific Notes attached.

4 Sources of metadata

Much of the assembled metadata is based on collections of reports, papers and other databases held at the British Geological Survey (BGS) and at the Centre for Environment Fisheries and Aquaculture Science (CEFAS). These holdings have been supplemented by the searches outlined above. Published BGS and CEFAS reports and grey literature identified in the database will normally be available at BGS and CEFAS (addresses in the accompanying database)

A database of marine environmental research around the British Isles was prepared by CEFAS and BGS in the late 1990s for DETR (now DEFRA) and is described in Rowlatt et al. (1999).

The database is available on CD and is referenced under Rowlatt and Ridgway (1999) in the database. A number of other studies have been prepared for DEFRA under the Marine and Land Based Inputs to the Sea (MLIS) programme. These are mostly in the grey literature but a list of relevant topics and bodies carrying out the research can be found on the DEFRA web site (www.defra.gov.uk/environment/marine/mlis/rplist.htm).

Dr P. D. Jones, of the Environment Agency, North West Region (EA, Richard Fairclough House, PO Box 12, Knutsford Road, Warrington, WA4 1HG) has prepared a bibliographic database of work on the Mersey Estuary and Liverpool Bay, which has been drawn on in the assembly of the present database. The EA is responsible for water quality in estuary and coastal waters to the 3 nautical mile limit and thus holds relevant databases on these topics. Data may be obtained from regional offices or from the National Centre. Addresses can be obtained from the EA web site at: www.environment-agency.gov.uk. A recent EA scoping study of sediment issues in England and Wales also provides some useful information (Power, 2002).

The Irish Marine Data Centre (ISMARÉ, Dublin) has an electronic database (Extended EDMED for Ireland) describing data collected by scientists in the waters around Ireland, some of which are likely to extend into SEA6. This is available on disk from the Irish Marine Data Centre, 80 Harcourt Street, Dublin 2, Ireland (www.marine.ie).

The Irish EDMED database is based on the format used by the British Oceanographic Data Centre (www.bodc.ac.uk), which keeps extensive information on marine environmental datasets held by UK laboratories (BODC, 1995). The BODC Directory of Marine Environmental Data Sets and website are good starting points for locating a wide variety of data types.

The Marine Biological Association (MBA: www.mba.ac.uk) and Plymouth Marine Laboratory (PML: www.pml.ac.uk) also have worked extensively in estuarine and coastal regions of the Irish Sea and are likely to hold databases of chemical information on waters and sediments.

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Appendix 2 Keywords used in searching the bibliographic databases

Irish Sea	The Little Minch	W. Loch Tarbet
Liverpool Bay	Treshnish Islands	Pabbay
Solway Firth	Skerrymore	Monach Islands
North Channel	Blackstones Bank	Sound of Barra
Mersey Estuary	Mull of Kintyre	Watersay Sound
Ribble Estuary	Rathlin Island	Loch Resort
Sellafield	North Channel	The Narrows
Straits of Dover	Ailsa Craig	Loch Maddy
Scilly Isles	Firth of Clyde	Loch Uskavagh
Fal	Beaufort's Dyke	Loch Carman
Tamar	Luce Bay	Loch Skipport
Falmouth Bay	Isle of Man	Loch Eynort
Cardigan Bay	Dundalk Bay	Loch Boisdale
St Georges Channel	Belfast	Castle Bay
Tremadoc Bay	Belfast Loch	Loch Watersay Sound
Menai Straits	Clyde	Red Point
Morecambe Bay	Ailsa Craig	Berneray Sound
South-West Approaches	Bute	Shillay Sound
Celtic Sea	Great Cumbrae	Loch Grimashadur
Bristol Channel	Little Cumbrae	Loch Luirbost
English Channel	Inner Clyde, Clyde	Village Bay
Severn Estuary	Enard Bay	Loch Bracadale
Lyme Bay	Rubha Coiseach	Ardnamurchan Point
Poole Bay	Edrochillin Bay	Tiree Passage
Southampton Water	Glasgow	Loch Soridain
The Solent	Stanton Bank(s)	Jura Sound
Malin Sea	Larne	Firth of Lorne
N.E. Atlantic Ocean	Ronan Basin	Oban
Hebrides Shelf	Priest Island	Greenock
Inner Hebrides	Finnan Islands	Dumbarton
Scottish Mainland	Western Island	Sound of Mull
Malin Sea	Shiant Islands	Eddrachillis Bay
South Minch	Loch Roag	Loch Lauford

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Loch Inchard	Loch Goil	Caol Moire
Kilbrannan Sound	Loch Striven	Ayr Bay
Ailsa Craig	Dunoon	Brodick Bay
Loch Ryan	Inchmarnock Water	Irvine Harbour
Stranraer	Loch Gilp	Troon Harbour
Mull of Galloway	Loch Tarbet	Ayr Harbour
Burrow Head	Gigha	Firth of Lorne
Peel	Sound of Gigha	Organic contamination
Isle of Man	Corryvreckan	Sediments
Port Erin	Loch Crinan	Contaminants
Calk Sound	Loch Etive	Contamination
Port St Mary	Loch Crenan	Stratigraphy
Castletown Bay	Loch Leven	Geology
Loch Carlingford	Loch Eil	Petroleum
Strangford Loch	Lismore Island	Quaternary
Donaghadee Sound	Linn of Morven	Holocene
Ardglass Harbour	Lynn of Lorne	Radionuclides
Killough Harbour	Loch Ailne	Seismic
Larne Harbour	L. A'Choire	Tectonics
The Maidens	N. Nevis	PAH
Portrush	Loch Tudth	PCB
Kilbrannon Sound	Sound of Iona	Deposition
Campelton Loch	Treshnish	Metals
Sanda Island	Gott Bay	Hydrocarbon
Holy Loch	Gunna Sound	TBT
Ardrossan	Loch Eathama	Environment
Greenock	Kyle Rhea	Sea floor
Gourock	Loch Euich	Metal
Gareloch	Loch Alsh	Processes
Rhu Narrows	Kyle Akin	Trace elements
Faslane	Strome Narrows	

Appendix 3 Bibliography (Endnote © format)

Annotated references in Endnote© format are on compact disc.

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