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THE UNITED KINGDOM'S DIGITAL MARINE ATLAS (UKDMAP): AN OPERATIONAL TOOL FOR FISHERIES SCIENTISTS IN PARTICULAR AND MARINE MANAGERS AND PLANNERS IN GENERAL

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Abstract

The latest version of UKDMAP is now generally available. It has 468 charts relating to all aspects of the seas around the United Kingdom and Ireland and as such is becoming a first-call point-of-reference for workers in many marine fields and particularly in those of fisheries and coastal zone management matters. It costs UK£56.40 and there is a user community of 500 at present. A brochure is available from the authors that describes its hardware needs. The software is very user-friendly. Spin-off disks dedicated to the production of a UK Coastal Zone Directory, meeting EC Shellfish Hygiene Directive needs and digital publications *per se* respectively are described and future plans outlined that include the development of a *Windows* interface during 1994.

Introduction

When the management of the oil and gas fields in the North Sea was being discussed in the early 1970s A J Lee, then of the Fisheries Laboratory, Lowestoft, found that the various UK committees involved did not have to hand the maps of marine resources and oceanographic parameters that had been commonplace in ICES circles for generations. Consequently he saw to it that an A4, black-and-white xeroxed collection of these maps was made and this proved

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to be very popular in the period 1976-80 with over 1000 users spread across the fields of science, education, government and industry. An A3 coloured version followed in 1981 of which there are more than 4000 copies in circulation (Ref 1). Originally the idea was that this version would be updated and enlarged at about five-yearly intervals but after a Marine Resource Atlas Colloquium had been held in London in 1985 it was clear that a digital version had become a more practicable proposition than in 1979 when the first enquiries in this direction had been made (Ref 2). As a result the monies available to update the printed Atlas were diverted to pump-priming the production of a prototype digital version which was demonstrated successfully to some 19 Ministers of the Environment at the North Sea Conference held in London in 1987. Subsequently a consortium of the Natural Environment Research Council (NERC), the Scottish Office Agriculture and Fisheries Department (SOAFD), the then Nature Conservancy Council (NCC), the National Rivers Authority (NRA) and the Ministry of Agriculture, Fisheries and Food (MAFF) financed the production of UKDMAP via a team within the British Oceanographic Data Centre (BODC) at POL. A first version comprising 112 charts was put on sale in 1991 at a cost of UK£23.50 and a second version with 468 charts costing UK£56.40 is now available. (See brochure attached). There is a user community of 500 at present.

The Atlas

UKDMAP does not set out to be a full Geographic Information System (GIS), but is rather a combination of a vastly more versatile equivalent of the traditional printed atlas and a series of geo-referenced catalogues and indices of material related to the marine environment. The Atlas system is controlled by a system of 'pull down' menus, backed up by a context-sensitive help system, which provides a very 'user-friendly' interface and requires the minimum of computing expertise on the part of the user.

The software requires an IBM PC (or compatible) with 640k RAM, an EGA or VGA display, and a hard disk with at least 10 Megabytes of free space. It is designed to run under DOS 3.0

or later, and will also run in the 'DOS Box' of the OS/2 operating system. A mouse (Microsoft compatible; the IBM PS/2 mouse is compatible) is highly desirable, but not essential.

Information within the Atlas is presented as a series of colour charts which the user may browse, zooming in to areas of specific interest and overlaying with information from another chart for comparison if desired. All charts are accompanied by descriptive text which may be viewed as a windowed overlay on the display, the text providing both educational and reference content, with the latter identifying the source of the displayed data together with any related datasets or expertise available from the source.

The true versatility of the Atlas is best shown by the 'queryable' datasets which it contains. When initially displayed, these datasets illustrate a maritime theme by the use of symbols which show, by their positioning and colour coding, the location of features related to that theme. Each symbol may then be 'queried' in turn, causing detailed information for that specific location to be displayed in an overlaid text window. In this way, information which would occupy many pages of printed text may be displayed upon a single chart within the Atlas.

Amongst the enhancements of the second version of UKDMAP are a multi-point distance measuring option, a "subset" facility which permits the user to turn off or restore the display of individual items and a "printer driver" file that allows customisation to specific printers.

The Atlas is intended to offer a service both to users and to suppliers of information. Material appearing in the Atlas represents the endpoint of data collection, collation, processing and presentation carried out by the supplier. During this process, the information source will probably have amassed a substantial database of which the Atlas data is a summary, and gained (or already had) expertise in the field in question. The informative text which accompanies each Atlas presentation offers suppliers the opportunity to advertise the existence of such information sources, together with any services or technical expertise that they have to offer. In this way the Atlas user may more readily determine the availability of data and

technical expertise on a given subject, and the information supplier can ensure that more effective use is made of valuable data assets.

Future Developments

The low learning overhead afforded by UKDMAP ensures that the novice user is able to operate the Atlas system to good effect almost immediately, making it suitable for a far wider audience than more specialised Geographic Information Systems. This is still a powerful advantage but it has become clear from user comments, and from the papers presented at a second London Colloquium in 1991 (Ref 3), that more functionality would be welcomed. Above all, the facility for a user to add charts of his or her choice to the UKDMAP from a variety of sources is needed, and the capability to export Atlas charts in a form usable by other mapping or GIS systems is considered highly desirable. Unfortunately, the sheer variety of data sources (and hence of data storage formats) poses a major problem in the development of general purpose data import software, and it will probably be necessary to limit data input formats to a small number of pre-existing standards (e.g. comma-delimited files, ARC-INFO export format, etc.) at least one of which should be supported by most commercially produced database, mapping or GIS systems. The implementation of such a data import/export facility will permit the Atlas to integrate with a range of other software packages, and whilst the central sharp focus of the UKDMAP - its bringing together most of what is known about the seas around the British Isles - is maintained, the user can move towards whatever level of functionality is required for his or her purpose.

One member of the original consortium has already made use of the intrinsic adaptability of the UKDMAP format. The Joint Nature Conservation Committee (JNCC) maintains a number of databases relating to environmental factors, and for two of these, the Seabirds at Sea database maintained under *Paradox* and the Marine Nature Conservation Review (MNCR) maintained under *Advanced Revelation*, direct interfaces to the UKDMAP have been developed. These permit the user to query a database, extracting a subset of information which is relevant to his

or her needs, and then to export that information to UKDMAP format files. The data, in the form of a distribution plot or a queryable location chart, may then be viewed in conjunction with the standard UKDMAP charts using the normal Atlas display software. The UKDMAP therefore provides the JNCC with a user-friendly means of disseminating widely up-to-date information from its centrally maintained databases. Its first digitally published JNCC Report, *An Atlas of Marine Biological Surveys in Britain*, has been released as UKDMAP format files on floppy diskettes. (Ref. 4)

Within MAFF the spin-off process from UKDMAP has already taken several forms. Two of considerable interest across the ICES community are first a prototype Coastal Directory and second a collection of large-scale maps, mapped at 1:25,000 but eminently usable at 1:6000, of the 70 estuaries of England and Wales that have shellfish beds. The first of these projects deals with the many uses of the North East coast of England and currently has some 119 maps of the 12 miles Territorial Sea that can be browsed through as and when *ad hoc* enquiries are made by policy-makers or planners. The second will provide the substance of one part of the UK's response to the EC's call for a dossier of current shellfish resources under the 1993 Shellfish Hygiene Directive. It will also be, effectively, the starting point of a readily-updatable, screen-based record of subsequent developments in all or any one of the shellfish beds.
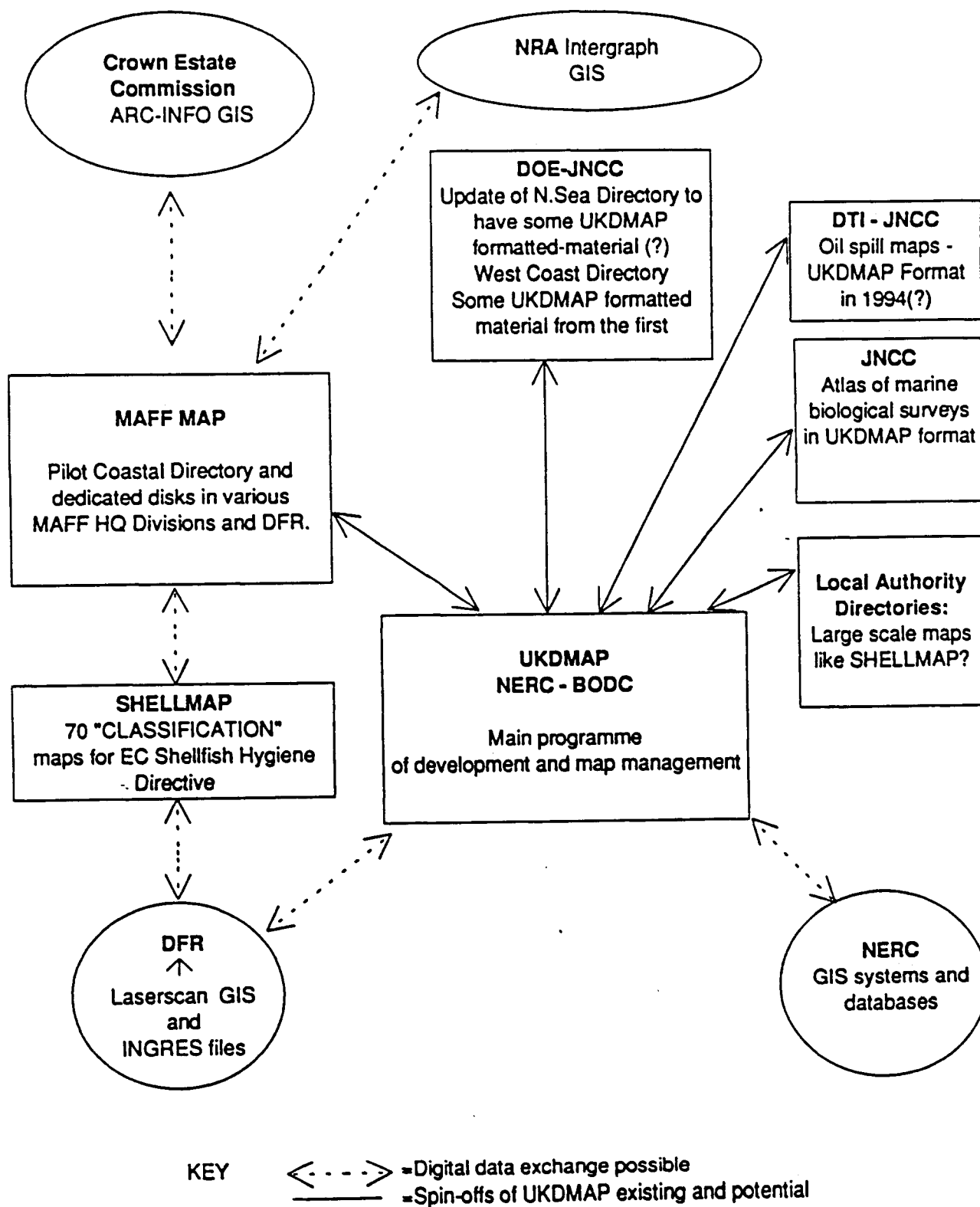
It is expected that when these initial spin-offs from UKDMAP become generally known during the last quarter of 1993 many other agencies will realise the potential of the package in relation to their own areas of responsibility and aim to have produced dedicated disks in UKDMAP format. (Fig 1). An added attraction will be the development during 1994 of a *Windows* based version. Since device drivers for a wide variety of printers and plotters are already built into the *Windows* system the Atlas would inherit their functionality, and this would ensure that the user could prepare hardcopy from the UKDMAP on the specific printer or plotter connected to his or her PC. The software would conform to the *de facto* standard user interface which is common to all *Windows* applications, reducing still further the low

learning overhead involved in using the UKDMAP. An additional advantage would be the facility with which graphical information may be "cut and pasted" between *Windows* applications, permitting sections of UKDMAP charts to be incorporated more easily into wordprocessed documents and reports.

References

1. 1981 Lee A.J. and Ramster J.W. (Compilers) Atlas of the Seas around the British Isles. MAFF London. 75 maps (unpaginated).

2. 1991. Ramster J.W. A proposed digital atlas of the resources of the North Sea and its potential value in planning. Ocean and Shoreline Management. 16. 359-373.

3. 1993 - (See Note) Ramster J.W. (Ed.). Marine resource atlases - an Update. Summaries of the presentations at the 1991 London Colloquium, RICS. (In Press. Enquire of Editor).

4. 1993. Mills D.J.L., Hill P.O., Thorpe K. and Connor D.W. An Atlas of Marine Biological Surveys in Britain, JNCC Report No. 167.

Figure 1

PROJECTS RELATED TO THE MAIN UKDMAP PROGRAMME (1993)

Crown Estate Commission ARC-INFO GIS

NRA Intergraph GIS

DOE-JNCC
Update of N.Sea Directory to have some UKDMAP formatted-material (?)
West Coast Directory
Some UKDMAP formatted material from the first

DTI - JNCC
Oil spill maps - UKDMAP Format in 1994(?)

JNCC
Atlas of marine biological surveys in UKDMAP format

MAFF MAP
Pilot Coastal Directory and dedicated disks in various MAFF HQ Divisions and DFR.

Local Authority Directories:
Large scale maps like SHELLMAP?

UKDMAP NERC - BODC
Main programme of development and map management

SHELLMAP
70 "CLASSIFICATION" maps for EC Shellfish Hygiene - Directive

DFR
Laserscan GIS and INGRES files

NERC
GIS systems and databases

KEY   <- - -> =Digital data exchange possible
———— =Spin-offs of UKDMAP existing and potential

British Oceanographic Data Centre

UNITED KINGDOM DIGITAL MARINE ATLAS
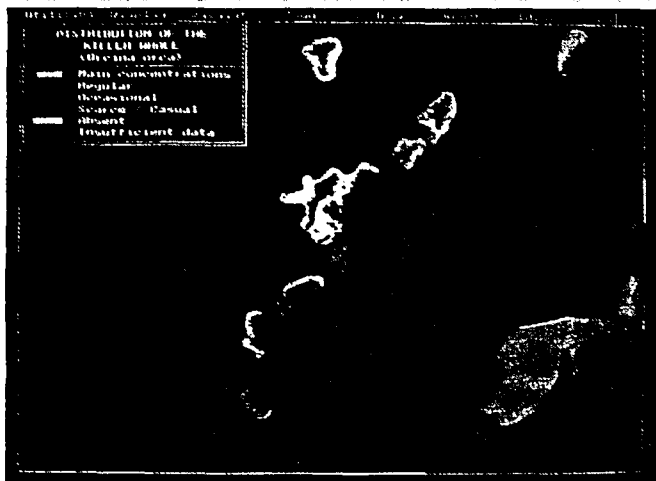## (Second Edition)

Natural Environment Research Council

INTRODUCTION

The Second Edition of the United Kingdom Digital Marine Atlas is now available for purchase. This latest edition builds upon the foundation laid by the first ('beta test') release, and has a greatly expanded data content (462 charts) which is more evenly distributed throughout the range of marine topics, and places greater emphasis on environmental conservation and reference material.

Software functionality has been enhanced to simplify data selection, to offer greater flexibility in the manner in which information is presented, and to provide additional tools for deriving information from the displayed charts. The system will now support multi-user concurrent access *via* a Local Area Network (LAN), and provides for a variety of destinations for graphical and text print files (including printing to disk).
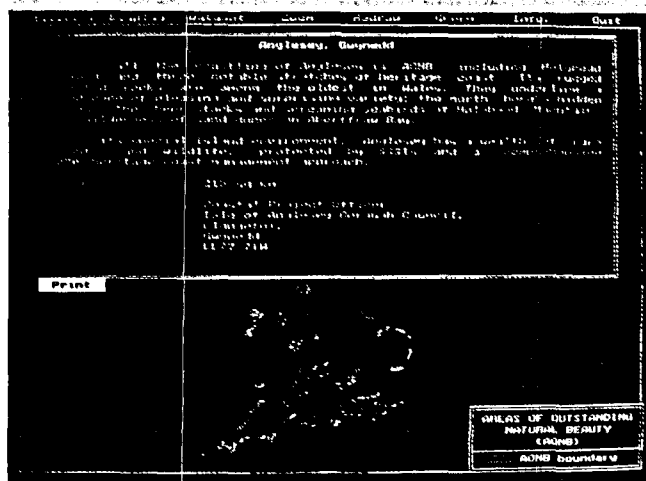

A greatly increased data content on a wide variety of maritime themes

SECOND EDITION ATLAS CONTENTS

The Atlas presently contains 462 charts covering a wide variety of maritime themes under the following general headings:

* General Reference	18 charts
* Marine Geology and Geomorphology	11 charts
* Marine and Coastal Parks, Reserves and Protected Areas	15 charts
* Marine and Coastal Conservation in Great Britain	8 charts
* Sea Birds	25 charts
* Sea Mammals	11 charts
* Marine Biology	29 charts
* Currents, Tides and Surges	19 charts
* Winds, Waves and Weather	21 charts
* Seawater Temperature, Salinity and Nutrients	162 charts
* Chemical distributions	33 charts
* Exploitation of the Marine Environment	12 charts
* Fishing Areas and Fish Spawning Areas	24 charts
* Fishery Statistics	50 charts
* British Oceanographic Data Centre - Data Catalogues	24 charts

Data contained in this edition of the Atlas concentrate upon the area 45°N to 65°N, 15°W to 15°E, although a number of data sets, particularly those concerned with coastal phenomena, are of more localised extent, and a few charts extend to a wider geographic area.

Greater emphasis has been placed on environmental conservation

SECOND EDITION ATLAS ENHANCEMENTS

* An hierarchical, windowed, data selection menu which permits the datasets within the Atlas to be grouped together under collective headings, increasing user 'overview' of the Atlas contents, and enabling the greatly increased number of datasets within the Atlas to be accessed by the user in a clear and logical manner.

* Mouse control throughout the Atlas system (although keyboard control may still be used as an alternative if necessary or desired).

* A system 'reset' facility which restores system default values after they have been changed by the user.

* A multi-point distance measuring option, with distance displayed in miles, nautical miles and kilometres.

* A dataset 'subset' facility (for both foreground and background datasets) which permits the user to turn off or restore the display of individual data items, and to control the colour and style in which they are displayed. This permits the user to 'customise' the display, and is of particular utility to those users who have only a monochrome printer, since features may be set so that they are distinguished by shape and style rather than by colour.

* The option to query a dataset to determine its source scale.

* The option to query a dataset to determine its date of origin.

* The option to 'drop' an overlay dataset and return it to the main selection list.

* Flexibility of print output destination both for screen dumps and for text output. Print output may now be directed to any serial or parallel port of the PC or, alternatively, to a disk file for later printing or for transfer to a wordprocessor etc..

* Incorporation of a simple 'printer driver' file which enables textual output to be 'customised' to the specific make of printer employed. Template files for Epson, HP Laserjet and null printers are supplied with the system.

* Implementation of a 'system defaults' file which specifies the screen resolution to be used, directory locations etc.. This permits the flexibility required by network users working on differently specified PCs.

USER FEEDBACK

BODC would welcome information concerning additional material which is both available and suitable for inclusion in the Atlas, your comments on the present system, and your suggestions for additional content and functionality that you feel should be added to later releases. If you wish to assist BODC by offering feedback in any of these ways, please contact the UKDMAP Project Manager at BODC.

SYSTEM REQUIREMENTS

The software requires an IBM PC (or compatible) with 640k RAM, an EGA or VGA display, and a hard disk with at least 10 Megabytes of free space in which to install and run the Atlas software.

The software is designed to run under DOS 3.0 or later, and will also run in the 'DOS Box' of the OS/2 operating system.

A mouse (Microsoft compatible; the IBM PS/2 mouse *is* compatible) is highly desirable, but not essential.

TO OBTAIN YOUR COPY OF THE ATLAS

The Atlas, including its display software, is distributed on floppy disk, and is accompanied by a printed User Guide and other documentation. Both sizes of IBM PC format disk are available, but at high density only (i.e. 1.2Mb 5.25", and 1.44Mb 3.5").

The Second Edition of the UK Digital Marine Atlas is being distributed at a price of £48.00 plus VAT, inclusive of postage and packing (i.e. £56.40 VAT inclusive). To obtain your copy, please send your company's official order (or send cheque with order for personal copies) to:

> UKDMAP Orders,
> British Oceanographic Data Centre,
> Proudman Oceanographic Laboratory,
> Bidston Observatory,
> Birkenhead,
> Merseyside,
> L43 7RA

Please ensure that you clearly state what size of floppy disk you require. Cheques should be made payable to the Natural Environment Research Council.

SPECIAL UPGRADE PRICE

Users of the First Edition of the UK Digital Marine Atlas may upgrade to the Second Edition for the special price of £28.00 plus VAT (i.e. £32.90 VAT inclusive).

If you do not use the privilege order form supplied by BODC, please ensure that you specify 'Upgrade' on your order, and that the name and address on your order corresponds to that returned to BODC on your First Edition registration form.