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Sustainable Technology

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TOWARDS ESTABLISHING A TOOL TO PROVIDE BASELINE DATA ON THE FISHERIES WITHIN THE SUSSEX SEA FISHERIES DISTRICT.

Project ref. MA/1/1/003

Final Report

Mineral Industry Sustainable Technology Programme (MIST)

The Mineral Industry Research Organisation (MIRO) manages The Mineral Industry Sustainable Technology Programme (MIST). The programme is being funded through the Aggregate Levy Sustainability Fund (ALSF).

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Introduction

This report by the Sussex Sea Fisheries District Committee is the final report describing a project entitled 'towards establishing a tool to provide baseline data on the fisheries within the Sussex sea fisheries district'. The project has been developed with 50% funding through the Aggregate Levy Sustainability Fund (ALSF), the Sussex Sea Fisheries District Committee (The Committee) has met the remaining 50% of the funding.

The Sussex Sea Fisheries District Committee

The Committee is composed of 20 Committee members; 10 members are County Councillors who represent the constituent authorities that fund the Committee, 9 members are appointed by The Department for Environment, Food and Rural Affairs and 1 member is appointed by The Environment Agency. Committee members bring together a diverse range of skills and experience in inshore fisheries management. Importantly Committee members do not represent their own interests but the needs of the fishery as a whole; they utilise their understanding and experience of the fishery in the consideration of management techniques. The Committee currently employ 6 full time Fishery Officers, 2 part-time administrators and 1 part time engineer.

The Committee and its Officers have extensive information on inshore fisheries within their District. They are regularly called on to consult both formally and informally on various coastal development issues. Importantly for this project the Committee is a consultee on aggregate extraction applications.

Project Objective

"To provide a tool for the mapping of spatial and temporal distribution of fishing activity within the Sussex sea fisheries district, in a format which can be used by decision makers in the understanding of uses in the coastal zone". As afore mentioned the Committee are regularly called upon to provide consultation on inshore fishing activity, in relation to aggregate extraction and other uses of the coastal zone. This has been achieved historically by providing qualitative data on fishing activity based on Committee experience. Whereas this approach is very useful in the production of impact assessments the provision of such data in a quantitative form is more easily communicated and more readily transferable. The objective of the project therefore was to develop a tool to provide information on fishing activity in the area for which the Committee has competence in a transferable, quantitative format, and to communicate the provision of this information with stakeholders. The stakeholders include the aggregate license holders, license applicants, their agents (i.e. consultants), government departments such as DEFRA, local authorities, fishermen's representatives and non-governmental organisations.

Materials

Software

The following software was installed and used; Microsoft Windows 2000, Microsoft Office 2000. MapInfo Ver. 7.0.

Charts showing the Sussex Sea Fisheries District were also procured from METOC plc. through Intelliscan ltd.

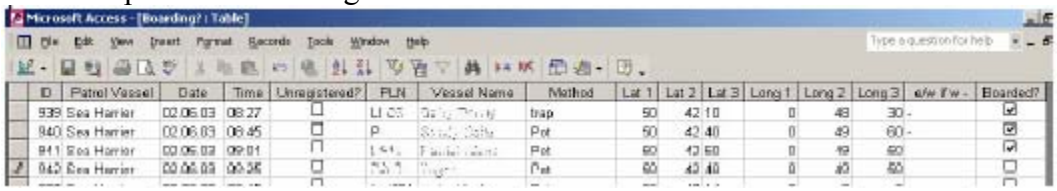
Hardware
A computer was purchased capable of running the required software. Spec. P4-2.8Ghz mem. 512MB, HD 60GB, Creative Labs graphics card 64MB (in-order to handle the advanced graphic requirements) and a colour monitor. A colour printer was also purchased.

Training
Bespoke and personalised training was arranged through Oakwood Environmental Ltd. A trainer attended the Committee Offices for 3 days, and they provided telephone assistance throughout the duration of the project.

Methods
The Committee operate patrol vessels throughout their District whilst undertaking routine, directed fisheries and environmental management /enforcement. During these sea patrols when fishing vessels are encountered fisheries patrol vessels record fishing vessel details, these details include: Patrol Vessel, Date, Time, Unregistered?, PLN, Vessel Name, Method, Lat, Long, e/w, Boarded? These details are recorded on a paper 'sightings log'.

During this project paper records of inspections were transferred into a computerised database (MS Access). The database holds details of Patrol vessel, date, time, vessel registration, vessel name, fishing method, latitude, longitude, and a reference to boarding record. Much of the personnel time allocated to the project was associated with data entry.

Screen capture of vessel log database.

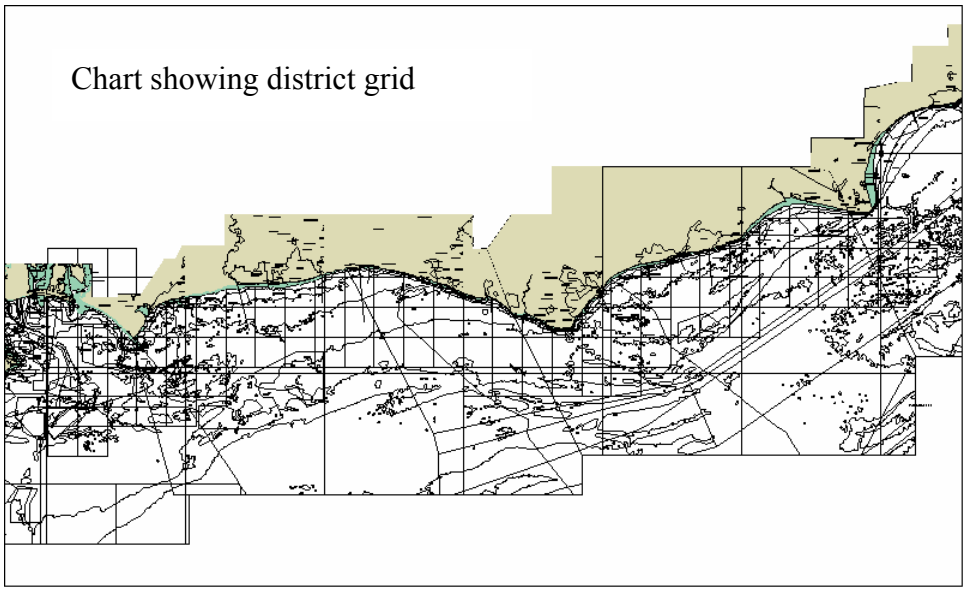


These records were then formatted using a macro to transform the sexagesimal data (latitude and longitude [degrees and decimal minutes]) into a MapInfo usable format – decimal degrees. (decimal minutes + minutes / 100) + degrees.

In June 2003 Oakwood Environmental limited were commissioned to provide training for 2 Committee personnel on geographical information systems and to develop in conjunction with the Committee a methodology for data analysis. MapInfo was then used to spatially and temporally map fishing data.

A methodology was developed to assign effort (patrol boat time) to the number of sightings recorded, whereby standardising the fishing effort. The methodology used to

describe effort is based on a qualitative assessment of patrol vessel movements based on interpretation from patrol vessel logs. Patrol vessel logs describe the patrol vessel's movements, they were analysed and the total area covered was recorded. The district was then split into 1 nm grids and a number of patrol vessel passes was assigned to each grid. The number of fishing vessel sightings per grid, by fishing method was then assigned, and the data standardised.



More details of this methodology can be found in a specially produced manual (see below).

MapInfo was then used to assign effort to sightings data based on additional information being assigned relating to patrol data.

A full description of the methodology used in the project can be found in a manual that has been developed by this Committee under a program of work sponsored under the MIST 3 program. The manual and can be found at www.sussex-sfc.gov.uk/mapping.htm, and is included as an appendix to this report.

Personnel

3 key staff were involved in delivering the project. A total of 36 working days were allocated to the project.

Project time series

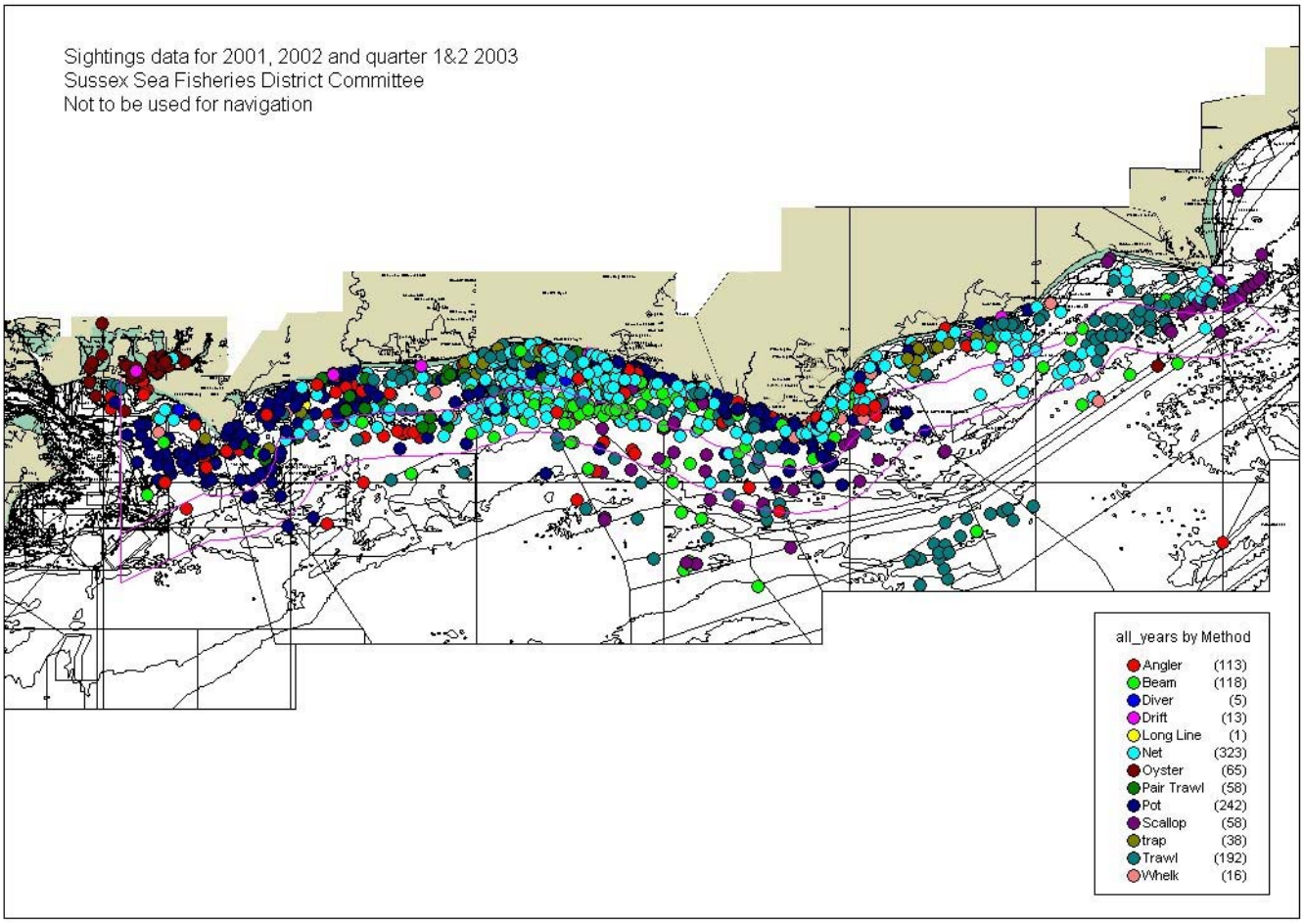
	January-03	February-03	March-03	April-03	May-03	June-03	July-03	August-03	September-03	October-03	November-03	December-03
Procurement		◄	►	QR 1(2)								
Training					2(5)							
Collation						1(14)						
Data Entry							QR 1(2)					
Analysis								1 (2)				
Produce									1 (4)			
Publicise/report										QR 1(2)		
Audit and submit												
Personnel				R.C.	R.C. +another	T.B.	R.C.	R.C.	T.B.	R.C. T.D.		

key
1= personnel
(1)= days
QR= Quarterly Reports

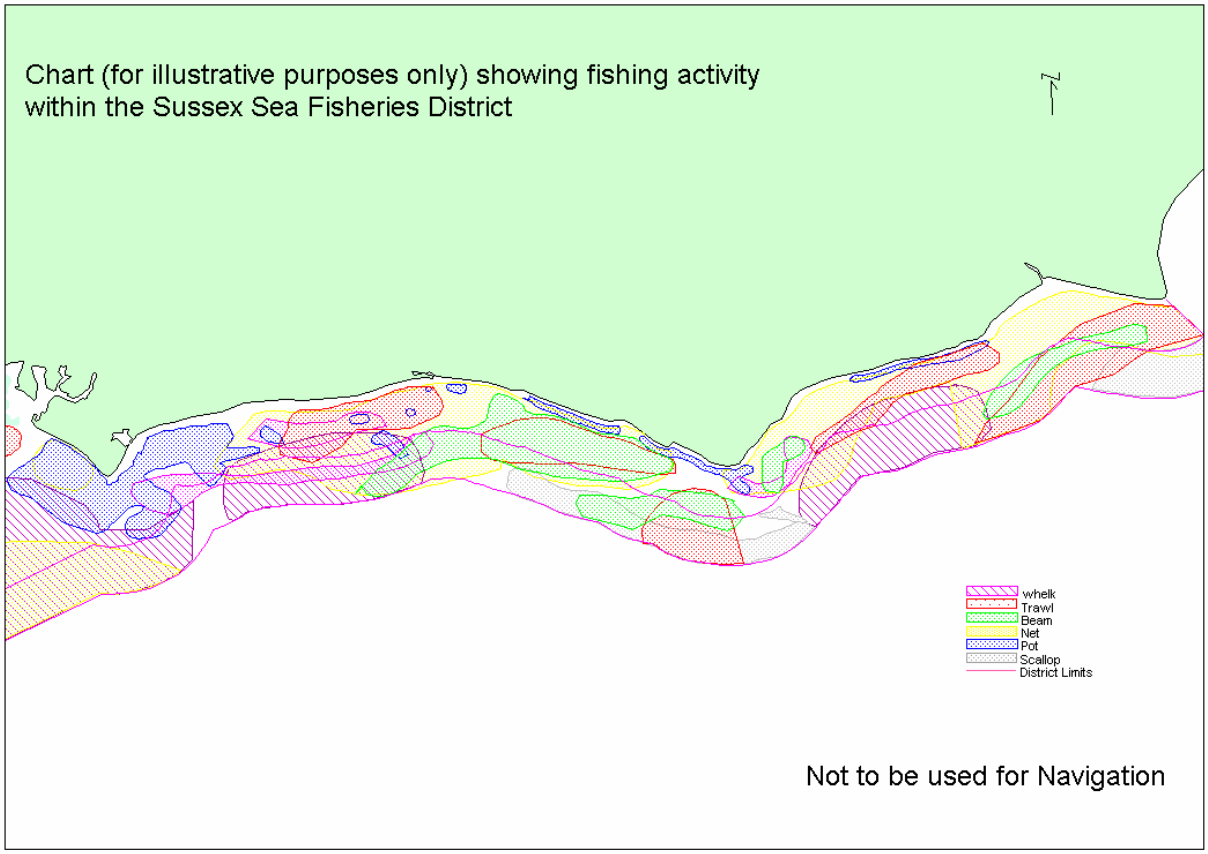
Results

A total of c. 1500 individual data records were formatted, representing 24,000 data entries. Usable data was available from 1999 to Quarter 2 2003. This data was entered onto yearly databases in MS Access. Data drop did occur (where the geographic position was spurious), but this represented less than 1 % of data entry and in each case the cause of drop was investigated, where appropriate the original data was revisited.

Figure 1 Point data overlaying the METOC. Note the magenta lines indicate the limits of the District (both the 3 mile limit and the 6 mile limit).



From the data above a qualitative analysis grouping fishing method by area was produced to give an indication of where the main fishing types are encountered.
Figure 2 Qualitative assessment of fishing activity grouping.



Relative effort

Quantitative relative fishing effort analysis was undertaken on the data described graphically in Figure 1, using the methodology described in the methods section. The data derived from this analysis was considered using local knowledge and considered in the context of the qualitative methodology used to input the patrol effort (patrol vessel movements). Whereby the entire patrol vessel logs were interrogated and a patrol path was assigned.

As this analysis was considered not capable of describing fishing activity it is not presented in the results section and is discussed further in the discussion section.

Publicity and data set provision

The primary tool for publicity of the project has been via the internet, although this method was not originally anticipated prior to the project commencing. As such no budget allocation has been made and the expense has been met through Committee expenidure. Information relating to the project can be found at http://www.sussex-sfc.gov.uk/mist.htm.

In addition to this the project was described to members of the South Coast Aggregate Liaison Committee, and a further presentation to this Committee will be made in 2004.

The Committee held a meeting with a representative from BMAPA (The British Marine Aggregate Producers Association), where the project and data were described.

Additionally data sets have been used in consultation with consultants acting on behalf of aggregate extraction organisations when developing extraction impact assessments.

In order to more fully publicise the value of the data and the application of GIS a Workshop has been arranged, and although outside the remit of this project it will draw heavily on the methodologies it has developed.

As described in the discussion section there are reliability issues associated with non-effort related data and the time series of the data is not described as adequate to facilitate full dissemination without interpretation, however the dissemination of the information at this stage with interpretation has been well received; and has not detracted from the objectives of the project.

The full publicity of this project cannot be described within the timescale of the final project report, as the 'tool' that this project has developed will be applied to further data as it is gathered. As additional data is available the reliability of the data will increase and the usefulness of the tools application will be seen through wider publicity of its results. Additionally a requirement for patrol vessel effort descriptions, in a format which can be applied to the g.i.s., has been highlighted and will be developed in future; this will facilitate data provision without Committee interpretation.

Discussion

The use of MapInfo as a tool to describe fishing activity within the Sussex Sea Fisheries District, using data derived from routine fisheries enforcement was successful. In its simplest form the interpretation described in figure 1, gives a coarse description of fishing effort within the District. Such data could be used by other stakeholders in describing interactions between marine activities and fishing activities (particularly as it related to the extraction of marine aggregates). It answers developers questions, inasmuch as the Committee are now able to present quantitative descriptions of where fishing activity has been observed to occur.

The provision of the fishing vessel sightings data from routine fisheries enforcement work in the format described in figure 1 facilitates analysis, with the addition of qualitative information from Committee Officers the tool begins to define ranges of fishing activity. This type of analysis is shown in figure 2.

The lack of data on the exact pathway movements of the fisheries enforcement vessels acts as a barrier to the full quantitative description of relative fishing activity. In this project however a methodology was described, and applied to the existing data, but this proved inadequate. However the projects remit 'towards describing a tool' was achieved as a methodology has now been developed. As of January 2004 the Sussex Sea Fisheries District Committee has put in a mechanism to describe quantitatively the movement of patrol vessels therefore this methodology can be effectively utilised.

The data time series January 1999 – June 2003 is not adequate to provide a full description of fishing effort. The provision of additional data through time will address this issue. Normal distribution of effort data is a requisite for quantitative assessment; however the data set this project provides is a significant development in the availability of information to stakeholders. Data users are able to assign confidence to the data based on its limitations as described in this report.

Finance

Mist project

Date of contract	21st January 2003
Estimate cost of project	£ 13,982.00
Grant available	50%
Maximum Grant	£ 6,991.00

Expenditure		Estimated	Actual	%Variation
Equipment				
20-Feb-03	Computer	£1,500.00	£1,580.50	105.37%
24-Feb-03	Colour Laser printer	£1,200.00	£1,580.50	104.58%
21-Mar-03	Vector Charts	£2,450.00	£2,400.00	97.96%
21-Mar-03	MapInfo Professional	£1,350.00	£1,095.00	81.11%
Training				
30-May-03	Oakwood Environmental	£3,000.00	£2,800.00	93.33%
24-Jun-03	Oakwood Environmental			
Sundries				
10-Sep-03	Stationery	£200.00	£83.96	41.98%
	Travel accommodation	£500.00	£ -	
Personnel Costs				
	Staff costs	£3,782.00	£3,782.00	100%
TOTALS		**£13,982.00**	**£12,996.46**	**92.95%**

Grant available –	50% of £12,996.46	£6,498.23
Received 28th February 2003		£2,796.40
Balance now due		**£3,701.83**

Conclusions

The conclusions to this project are considered in relation to the projects stated objectives. Objective one was ‘to provide a tool for the mapping of spatial and temporal distribution of fishing activity within the Sussex Sea Fisheries District’. This objective was achieved thought the development of a MapInfo based geographical information system using data contained in vessel sightings databases.

Objective 2 was to provide data in a format that can be used by decision makers in the understanding of uses in the coastal zone. This objective was achieved by developing a system within a commonly used and commercially available geographical information system.

Objective 3 being to ‘facilitate dissemination of fishing activity data to stakeholders, and to consolidate existing data. Taking each point in turn ‘facilitating dissemination of data’ has been achieved through the means described in the methods section, and indeed the tool developed under this programme is now widely used when the Committee is asked to communicate the location of fishing activity. The consolidation of existing data has been achieved through the entry of paper records onto a database that can and will be updated in the future.