Appendix 4. Spatial Analysis Methods

To undertake both the mapping of the interactions matrix results and of the number of activities undertaken at a location, MapBasic programs were developed to facilitate the large amount of data manipulation required.

Interactions Matrix Mapping
Face to face interviews with over 50 key stakeholders considered the nature, extent and intensity of user-user interactions between sectors within the C-SCOPE Marine Plan Area. These were compiled into a single, large matrix. One aspect of interpreting the results was the development of a MapInfo MapBasic program which expresses the interactions matrix spatially. The results help to inform marine plan policies aimed at enhancing safety, reducing conflict and optimising compatibilities. Figure 1. shows a small part of the matrix.

		Ports and harbours				Maritime Safety		
		Ports and harbours	Piers and Jetties	Maintenance dredging	Dredging Disposal	Lifeboat service	HM Coastguard	Navigation aids
Renewable Energy	Offshore Wind	Positive	Positive	Neutral	Neutral		Competition	Competition
	Wave	Positive	Positive	Neutral	Neutral		Competition	Competition
	Tidal	Positive	Positive	Neutral	Neutral		Competition	Competition
Subsea cables and pipelines	Electricity	Positive	Positive	Conflict	Neutral		Competition	Competition
	Oil/Gas Pipelines	Positive	Positive	Neutral	Neutral		Competition	Competition
	Outfalls	Positive	Positive	Neutral	Neutral		Competition	Competition
	Telecomms	Positive	Positive	Conflict	Neutral		Competition	Competition
Inshore fisheries	Scallop Dredge	Neutral	Neutral	Neutral	Neutral		Competition	Competition
	Demersal trawl	Neutral	Neutral	Neutral	Neutral		Competition	Competition
	Pelagic trawl	Neutral	Neutral	Neutral	Neutral		Competition	Competition

Figure 1: C-SCOPE Interactions matrix sample

A second output was a table listing the datasets that show where the activities take place. Some required a query to highlight areas of higher levels of that activity, for example where tanker densities exceed a certain number of vessels. A small part of the table is shown in Table 1.

Appendix 4. Spatial Analysis Methods

Table 1. Sample of datasets spreadsheet

Sector	Subsector	Data Comment	Table	Query
Renewable Energy	Offshore Wind	Offshore renewables capacity study - erased bits less than 8 NM from shore	Q:\GIS Users\Coastal Forum\CSCOPE\Data\Renewable Energy\Offshore Renewables Capacity Study\Temp Offshore Wind Potential Development Areas.TAB	
Renewable Energy	Wave	NONE IN MMA		
Renewable Energy	Tidal	Offshore renewables capacity study	Q:\GIS Users\Coastal Forum\CSCOPE\Data\Renewable Energy\Offshore Renewables Capacity Study\Tidal Stream Potential Development Areas.TAB	
Shipping and transport	Tankers	Shipping Density data has Tanker numbers	Q:\GIS Users\Coastal Forum\CSCOPE\Data\Shipping and Navigation\Shipping Routes\temp_ShippingDensity.TAB	Tanker_Total>=5
Shipping and transport	Bunkering	Got bunkering locations - moorings and quayside	Q:\GIS Users\Coastal Forum\CSCOPE\Data\Shipping and Navigation\temp Bunkering Locations.TAB	
Shipping and transport	Military shipping	Shipping Density data has Military Operations	Q:\GIS Users\Coastal Forum\CSCOPE\Data\Shipping and Navigation\Shipping Routes\temp_ShippingDensity.TAB	Military_Operations>1

The program was divided into two main parts controlled by a user interface.
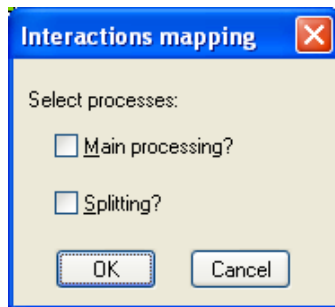
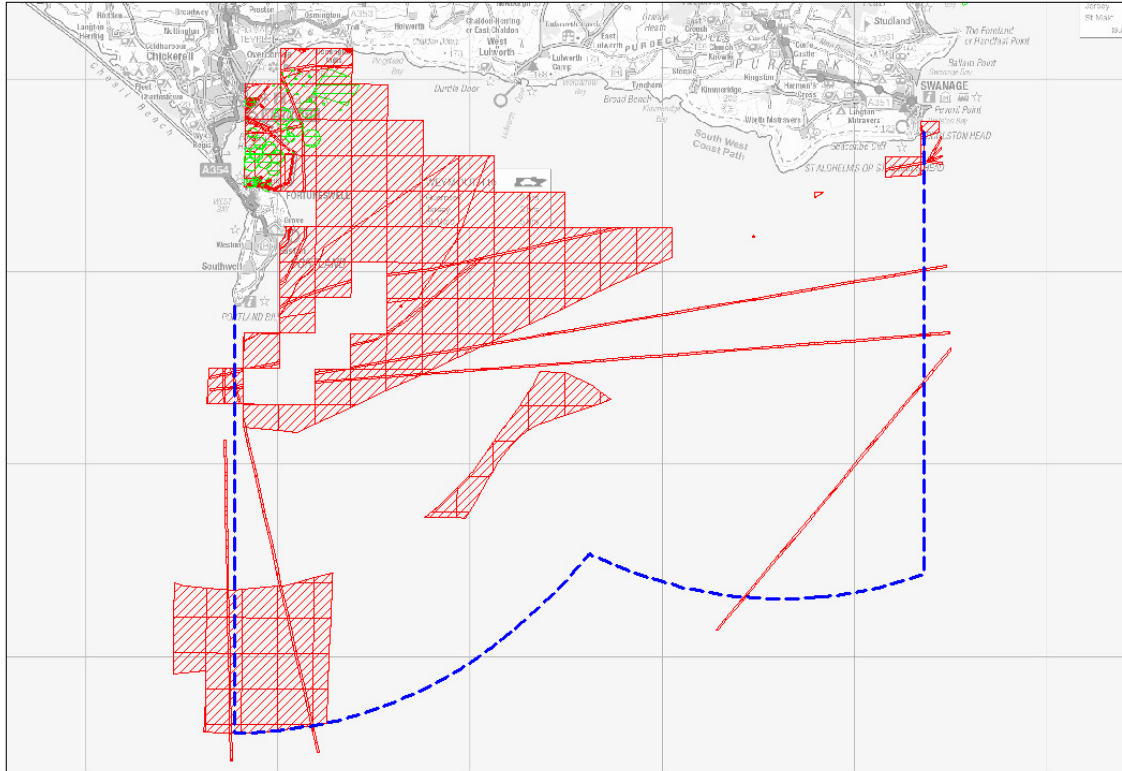# Appendix 4. Spatial Analysis Methods

Figure 2. Map produced for tanker interactions

This approach gave a large number of outputs (one per sub-sector). One way of summarising this volume of information was to intersect a grid of squares over the results store and count up the interactions of each type (positive, competition and conflict) per square. Trials were used to look at square size, considering the precision of the datasets and processing time. A grid of squares of 1 nautical mile edge was chosen.

Appendix 4. Spatial Analysis Methods

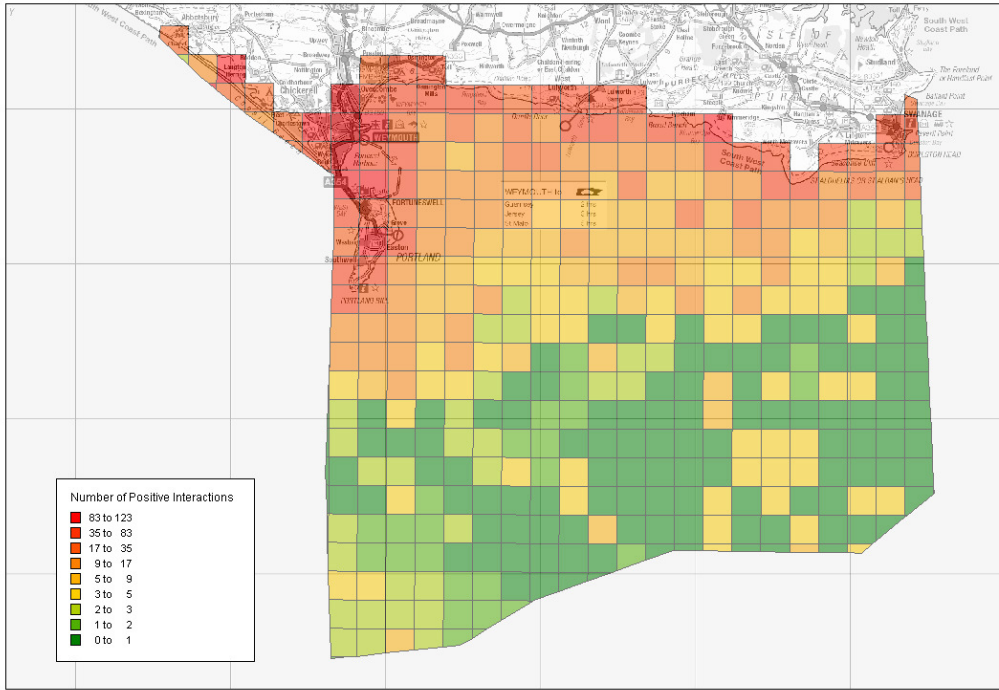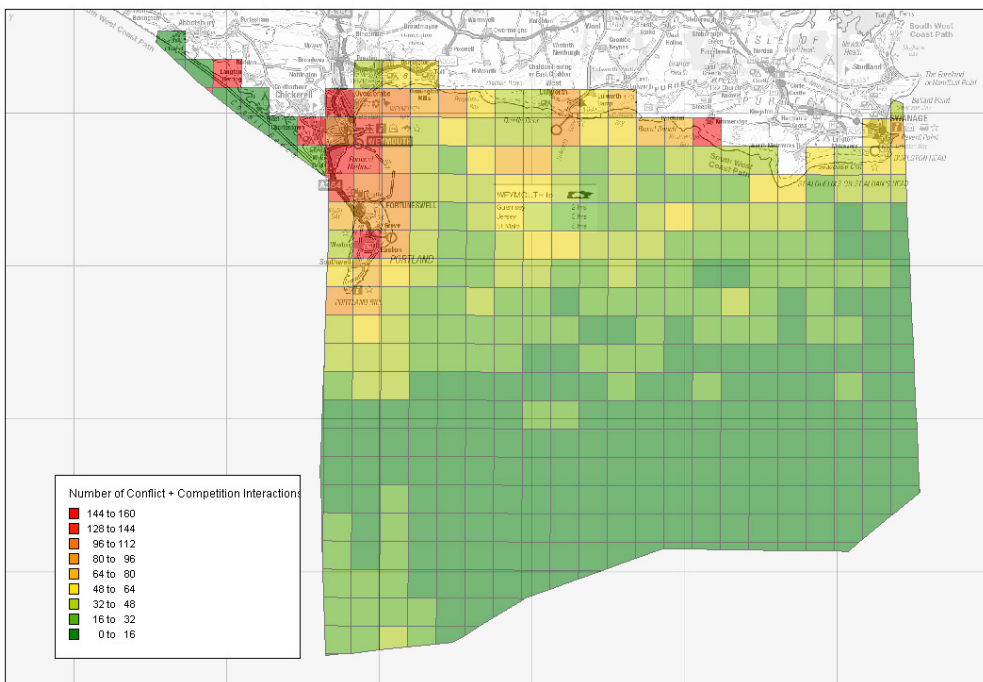Figure 3. Number of positive interactions per square.

Figure 4. Number of competitive and conflict (combined) interactions per square.

Appendix 4. Spatial Analysis Methods

Activity Count Mapping

A very similar MapBasic program was developed to determine the number of activities per grid square. This used the same 1 nautical mile squares.
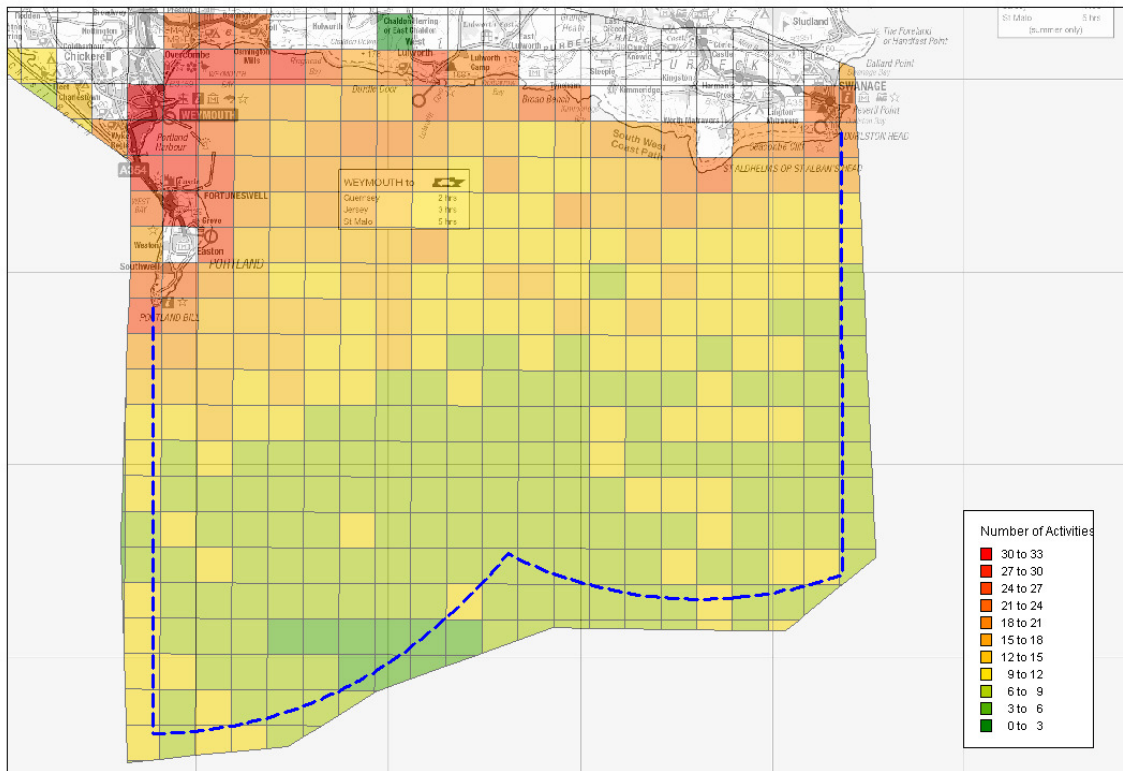

Figure 5. Number of activities per square