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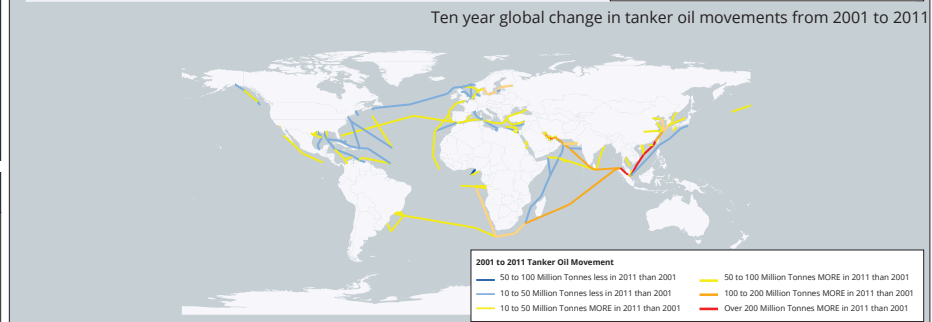
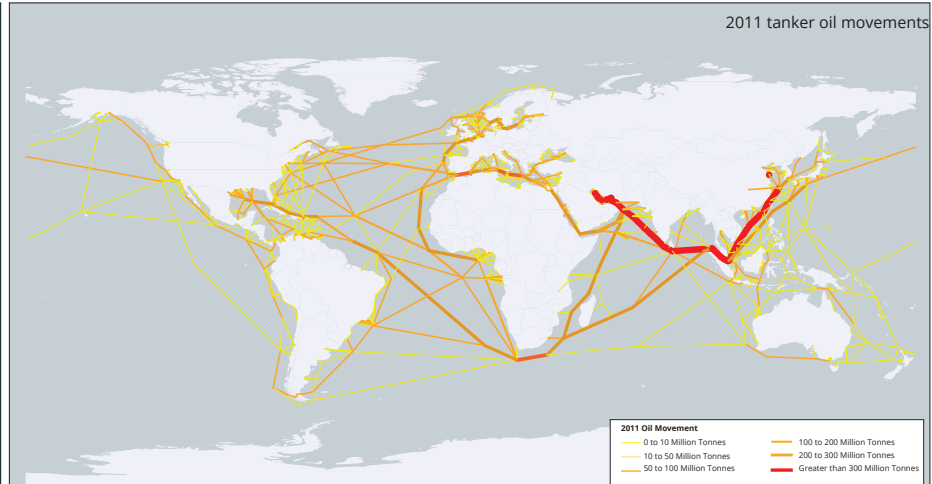
The International Tanker Owners Pollution Federation Limited

Understanding and assessing the risk posed by oil spills is an essential starting point in oil spill prevention, preparedness, and response. However, it is a complex process and displaying results of a risk analysis can be particularly challenging. By modelling and analysing volumes of oil transported globally over a ten year period from 2001 to 2011, using data obtained from Lloyd's List Intelligence and historical data from ITOPF's tanker spills database, an informative and useful representation of risk can be derived. Incorporation of local marine sensitivity data into the model can further improve the risk assessment process.

Although there has been a significant increase in seaborne oil trade over the last thirty years and this is predicted to continue for the foreseeable future, the number of accidental oil spills involving tankers is continuing to decline. GIS tools such as the one we describe are an important part of focussing the on-going efforts of government and industry. These tools can help build awareness of the risks through training courses and seminars and by developing regional initiatives in those areas where they can provide greatest benefit to minimise the threat of future incidents.

This poster shows how by using a GIS platform to graphically visualise information, regional areas of heightened vulnerability are more effectively identified and communicated.

Visualising spill risk: understanding and assessing regions of heightened vulnerability associated with increased seaborne transport of oil.



Introduction

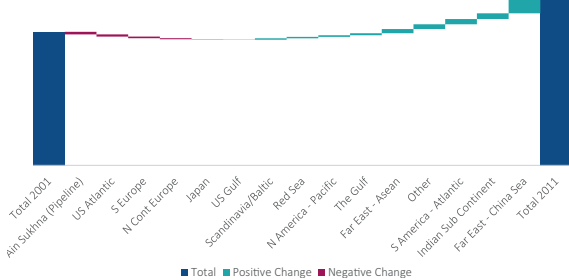
World seaborne trade grew by 4% in 2011 bringing the total volume of goods loaded worldwide to 8.7 billion tonnes and the total volume of crude oil loaded amounted to 1.8 billion tonnes¹. With new reserve discoveries, falling imports into the USA and increased demand in China, traffic flow has increased towards Asia.

Emphasis on areas of heightened risk ensures that efforts to assist with regional preparedness are best placed. The project encompasses global tanker traffic movement with the intention of using detailed data for specific regions of interest. In the initial phase the changes in transport over 10 years between 2001 and 2011, and the total amount imported or exported, highlighted the Far East as a key area of interest.

The table and graph below highlight the top five importing and exporting countries/regions and associated growth or reduction, in the 10 years from 2001 to 2011.

Importing Country	Change (%)	Exporting Country	Change (%)
USA	-2%	Saudi Arabia	11%
China	417%	Russian Federation	302%
Japan	-2.5%	USA	98%
India	125%	UAE	14%
Korea	36%	Iran	33%

10 year Change in Regional import cargo



Methodology

Risk is often defined as **Consequence x Probability**. For oil spills the consequence or impact is a result of a number of factors; the type and volume of cargo carried, proximity to any environmental and/or economically sensitive areas and the effectiveness of the response, including access to equipment. The probability of an oil spill is dependent on numerous factors including the density of vessel traffic, navigational hazards and the weather/sea conditions. Using GIS we are able to model some of these factors with semi-quantitative analysis, where the values allocated do not bear an accurate relationship to the likelihood or magnitude of consequence but give an overall picture of the level of risk. Several datasets for the variables were used to build the analysis:

Tanker Traffic

Lloyd's List Intelligence's analysis of petroleum exports (APEX) which examines all laden voyages (crude oil, dirty product and clean products) in tankers over 10,000 dwt, provides the raw data to enable the vessel movements and their associated cargo from 2001 to 2011 to be modelled geographically. From these movements the total tonnage travelled and changes in any particular location can be calculated.

Historical Incidents

Data on historical spills over 7 tonnes was extracted from the database ITOPF has maintained since 1974 on worldwide accidental oil spills from tankers, combined carriers and barges. The data held includes the type of oil spilt, the amount spilt, cause and location.

Protected Sensitive Areas

A global spatial dataset on marine protected areas created by UNEP-WCMC in collaboration with the International Union for the Conservation of Nature (IUCN) is used to highlight areas of sensitivity. Other environmentally sensitive information for coral and mangroves was included.

A one degree grid was calculated to display and map the levels of vulnerability. This highlighted the Far East as an area of concern due to the increase in oil movements of over 200 million tonnes in the 10 year period. An example of the results can be seen on the bottom left hand side of this poster.

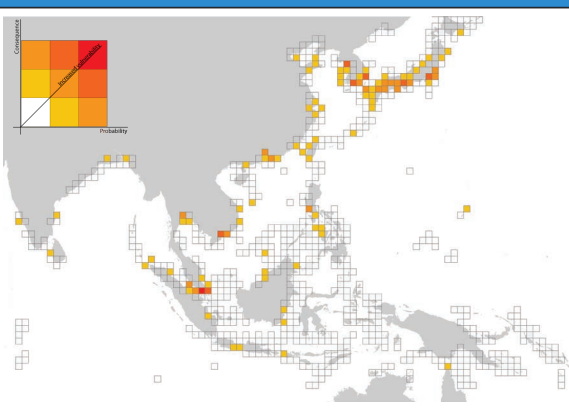
Outcome

Using this method a semi-quantitative subjective understanding of geographical locations vulnerable to oil spills can be mapped. This has shown that many countries at risk are not large oil importers and the threat is often from passing tankers.

The aim of the project is to collate information on oil spill risks and individual countries' oil spill preparedness. The state of preparedness depends on a number of factors including spill response organisation and policy, effective contingency planning and the availability of clean-up resources. In addition, ratification of international Conventions can provide access to compensation for oil pollution damage and assistance with preparing for and responding to spills.

It is hoped that this information when made available to the wider oil spill response community will assist with preparedness planning.

Example Vulnerability Map



Acknowledgments & Further information

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For more information on the project please contact LisaStevens@itopf.com

Raw oil movements data: Subset of Lloyd's List Intelligence APEX Data.

Protected Areas: IUCN and UNEP-WCMC (2010), The World Database on Protected Areas (WDPA) Cambridge, UK; UNEP- WCMC. Available at: www.protectedplanet.net

UNCTAD Review of Maritime Transport 2012