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Editorial

The English Channel and its catchments: Status and responses to contaminants

1. Introduction

According to the International Hydrographic Organisation (IHO, 1953) the western boundary of the English Channel (La Manche) is defined by a line from Ushant (Ouessant) to the Scilly Isles and the eastern boundary by a line across the Dover Strait from a point near Calais to one near Dover (Fig. 1). The English Channel covers an area of 77,000 km^2 and it has a combined population of 3.5 million people living on the coastlines making it one of the world's busiest sea areas. The coastal waters have a relatively high tidal range and the overall flow of seawater is from west to east, with a water replacement time of approximately 500 days. The total fluvial discharge from adjacent catchments is of the order 715 $m^3 s^{-1}$, of which 86% originates from rivers along the French coast between Calais and Brest, and is dominated by the Seine and its tributaries (Fig. 2). The estuaries are macro-tidal and systems on both sides of the Channel are contaminated by groundwaters, agriculture, domestic discharge, current and relict industrial inputs, although some estuaries, such as the Canche (France) and Fowey (UK), are regarded as fairly pristine. There are additional coastal impacts from intense maritime transport (including ports and dockyards), dredging and associated disposal of sediment, tourism, nuclear re-processing (including, between 1950 and 1963, the dumping of radioactive waste in the Hurd Deep), thermal discharges, and development of offshore structures (including renewable energy). This extensive human utilisation of the region implies that various species of riverine, estuarine and marine organisms, and their habitats, are under considerable pressure. Environmental sustainability is particularly important when considering that fish landings in 2010 for 12 UK ports along the south coast amounted to 59,000 tonnes, according to the Marine Management Organisation. Aquaculture (shellfish and algal products) is also an important economic and social element at a local level. Therefore, methods to assess impacts and coherent plans for the protection of the marine environment from hazardous substances (such as metals, persistent organic compounds and radionuclides), physical damage and biological threats (from microbes to invasive species) are required. The scientific building blocks for strategic planning are only now beginning to bear fruit as a result of collaborative projects conducted by partnerships on the north and south coasts of the English Channel, notably under the aegis of UK-France INTERREG programmes.

Even though the English Channel is an important biological and physical resource, there has been little in respect of holistic publications on key scientific aspects over the past 20 years. Three decades ago the 17th European Marine Biology Symposium on "Fluctuation and Succession in Marine Ecosystems" was held in Brest and a special volume of *Oceanologica Acta* was published (Cabioch et al., 1983), although not all papers were devoted to the English Channel. In 1993, the North Sea Task Force compiled a quality status report (QSR) on the physical, chemical and biological conditions in the English Channel (Reid et al., 1993), together with an assessment of human impact. Arguably, this was the most comprehensive assessment at that time and remains so to the present day. However, since 1993 substantial strides have been made in techniques for assessing man's impact on marine ecosystems, particularly in the waters of the English Channel. Subsequently, the EU funded a major research programme, named "Flux manche", concerned with the transport of metals, radionuclides, suspended particles and organic matter from the eastern English Channel into the North Sea (Statham et al., 1999). Updating and re-evaluation of the English Channel QSR was undertaken by Tappin and Reid (2000) in a book devoted to "Seas at the Millennium", where particular emphasis was given to contaminants and their effects. Gibbard and Lautridou (2003) also produced a special volume of the *Journal of Quaternary Science*, which considered geological aspects of the English Channel. More significant, is the publication of the Quality Status Report 2010 (OSPAR, 2010) in which the English Channel is integrated into Region II, that is the Greater North Sea. The problem with the OSPAR approach to the compartmentalisation of its sea areas is that insufficient prominence is given to the English Channel because of a greater focus on the North Sea and its coastlines. This lack of attention to the English Channel further supports the need to have the most up-to-date information published in a dedicated volume, rather than being dispersed in various journals. It is also important to give a platform to alternative methodologies, outside the confines of the statutory assessments which form the mainstay of Quality Status Reports. A catchment-based view is considered worthy of pursuit in this context, given the moves

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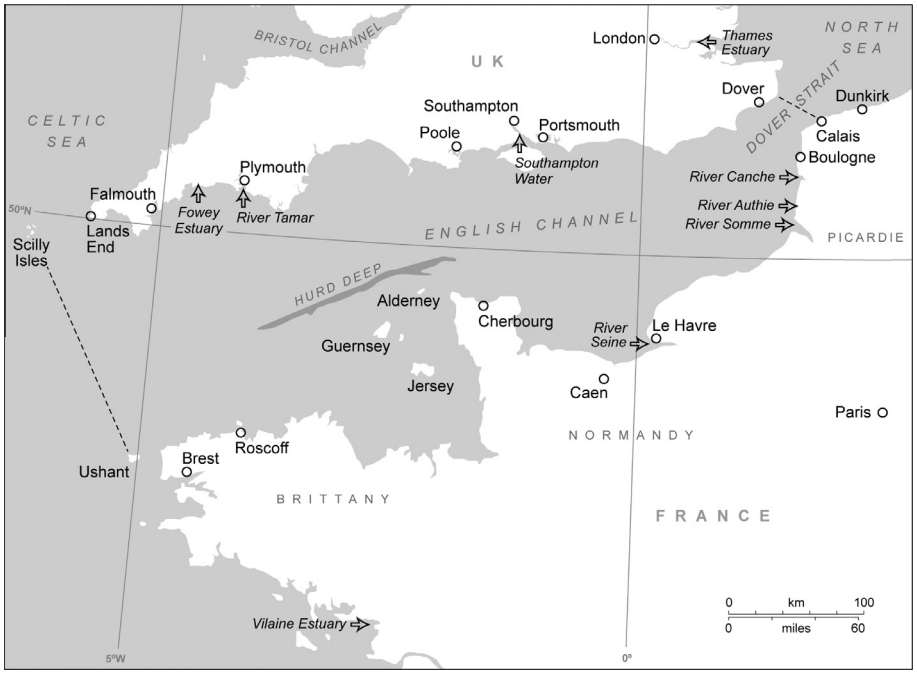

Fig. 1. The English Channel. The dashed line between Ushant and the Scilly Isles represents the western boundary and the dashed line across the Dover Straits the eastern boundary (IHO, 1953). Some of the key features and locations described in this editorial are displayed.

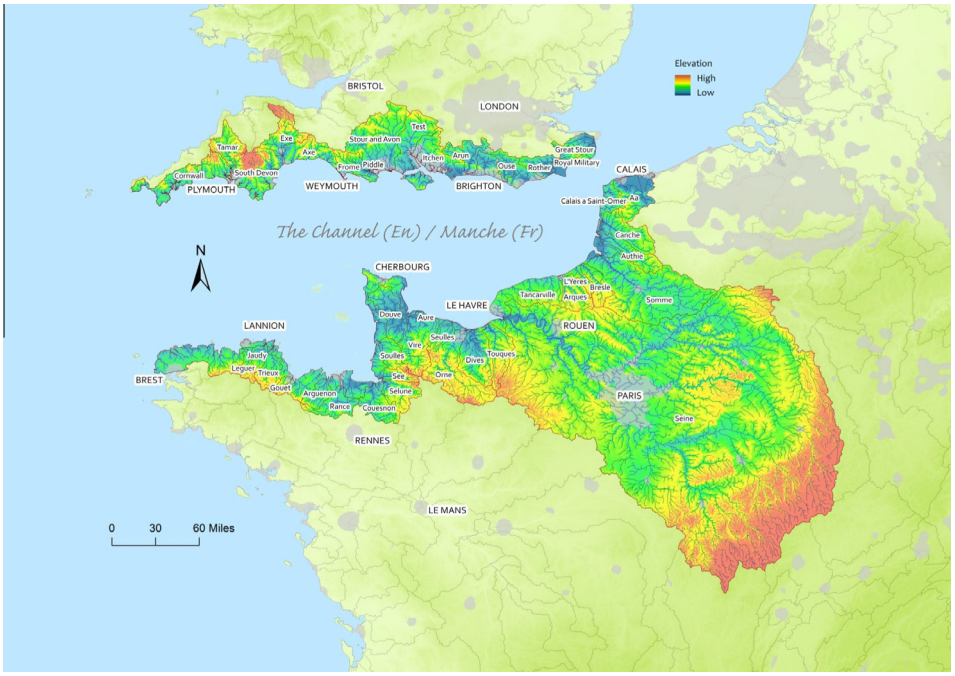

Fig. 2. English Channel Catchments dominated by inputs from rivers along the French coast, notably the Seine and its tributaries.

towards river-basin management by national and regional agencies. Priority is also given to new and integrated approaches which address the biological consequences of exposure to contaminants, as these are pertinent to European Directives and emerging strategies aimed at improved environmental protection (encompassed, for example, in the requirement to achieve Good Ecological Status under the EU Water Framework Directive and Good Environmental Status under the Marine Strategy Framework Directive, 2000/60/EC and 2008/56/EC, respectively).

With these considerations in mind the current issue of *Marine Pollution Bulletin* is a collection of contemporary, research-oriented papers on crucial aspects of the status and impacts of contaminants in the catchments, estuaries and marine ecosystems of this vital regional sea area. Many stem from integrated research projects hosted by the EU INTERREG IVA programme, including DIESE ("Determination of Indicators for Environmental monitoring: a Strategy for Europe") and CHRONEXPO ("Studies of the Effects of CHRONic EXPOsure of Marine Organisms to Contaminants from Industry in the English Channel"). Other France-UK projects from