'The 'PEGASEAS' project was selected under the European cross-border cooperation programme INTERREG IV A France (Channel) – England, funded by the ERDF."

Promoting Effective Governance of the Channel Ecosystem
Promouvoir une gouvernance efficace de l'écosystème de la Manche

07

Effective practices to manage the impact of the human activities on the marine environment.

ABSTRACT

The marine environment includes the waters of seas and estuaries, the seabed and its subsoils, and all marine wildlife within its sea and coastal habitats. It is a precious asset, a heritage that must be protected, conserved and effectively valued. A wide range of human activities take place in and around the cross-Channel region and, in order to safeguard the long-term productivity of economic and social activities taking place in the Channel, while also managing the impact of those activities on the different ecosystems, urgent protection efforts in this region are necessary. Best practice examples and lessons learnt from a number of projects within the Interreg IV programme are discussed. Recommendations and areas for further research are then identified.

KEY WORDS

ECOSYSTEM-BASED MANAGEMENT
HUMAN IMPACT
INTEGRATED MANAGEMENT
CLIMATE CHANGE IMPACTS
MARITIME SAFETY
MITIGATION STRATEGIES

DESCRIPTION OF KEY FINDINGS

Introduction

The marine environment in the cross-Channel region is a great contributor to economic prosperity, social well-being and quality of life. It is a major route for both passenger and cargo shipping and therefore is an area where maritime safety and pollution prevention are of great importance. The cross-Channel region constitutes a fund of resources which can be used to achieve greater economic potential, so its protection is crucial, more so because the marine environment is deteriorating fast. There is an increasing density and diversity of activities in an already busy sea area, leading to increasing pressures on space and resources which may be approaching saturation. This is particularly evident in the Dover Straits, the narrowest part of the Channel Sea[1].

There are a variety of lessons arising from the Interreg IVA France (Channel) – England programme pertaining to effective practices for the management of the impact of human activities on the marine environment. The discussion below categorises these lessons into four themes: managing emergent technologies;

1 CAMIS (2013). *Integrated Maritime Strategy for the Channel Region: a Plan for Action*, page 29. Available at: https://camis.arcmanche.eu/stockfiles/user/4/13_247_Camis_doc_strategie_maritime_UK_BD_1.pdf

managing issues of marine pollution from ships; managing fisheries impact on habitats in marine protected areas; and managing issues of environmental quality.

Managing Emergent Technologies

Best practice within sustainable energy projects (e.g., MERiFIC and OFELIA) includes the following recommendations:

- Appraisal of projects should be done in the context of ecosystem stressors and receptors;[2]
- Mitigation of environmental impacts requires a good understanding of the marine renewable energy (MRE) device impacts at local (< 1km), distant (1-10km), and regional (> 10km) scales;
- Colocation of different sustainable energy devices (e.g.: wind and wave) may be considered whenever possible, to reduce the environmental impacts;[3]
- Bio-fouling may be exploited for synergies between MRE devices and fish stock restoration, aquaculture, leisure activities, or other;
- Best practice recommendations are needed to address disturbances induced by MRE devices (risk of collision, noise, electromagnetic fields) and their impacts on wildlife and fish stocks, for example;
- Measures for enhancing the integration and public acceptance of MRE projects should be implemented, to avoid social and economic impacts, for example on local residents and tourism.

Managing issues of marine pollution from ships

The CAMIS project[4] has raised a number of issues in relation to marine pollution and oil spills from ships, including that the risk of accidental marine pollution is not falling, but changing and becoming more complex to manage as a result of high maritime traffic density, transportation of dangerous goods, difficult navigation conditions, and major sea/land exchanges. These incidents can have harmful impacts on human life, cause environmental damage, and have economic consequences. The Cross Channel Declaration on Shipping Incidents and Marine Pollution developed through CAMIS[5] represents a commitment at local and regional levels for common action to reduce the occurrence and impact of marine pollution from shipping incidents. The Declaration calls for improved cooperation, information and communication in response to the threat of pollution from ships. The dissemination of information relating to pollution is seen as key to resolving issues and reducing risk. That information will also be of assistance in responding to marine pollution incidents rapidly and with the correct tools to deal with the specific type of pollution.

CAMIS also identified that the tools required to deal with oil spill clean-up differ from those required for chemical spills, which needs to be considered throughout spill planning, data provision and response. ARCOPOLplus has addressed this, by developing a Hazardous and Noxious Substances (HNS) Spill Incidents Database[6]. The database includes information on previous spills and datasheets, including weathering and fate information, for chemicals. A risk-based prioritisation tool was developed which allows prioritisation of HNS transported within a region or port, based upon chemical and toxicological data and user-defined local shipping information.

Managing fisheries impact on habitats in marine protected areas

The Sussex Inshore Fisheries and Conservation Authority (IFCA) has been working within PANACHE on exchanges with French partners about fisheries risk assessment. This project is ongoing until June 2015 but has already had some positive results. In European Marine Sites, the management of commercial fishing activities is based on the assessment of the impact of those activities to ensure they are compatible with the regulations implemented in such areas (risk assessment of the fishing activity). A matrix-type approach to identify whether an activity needs management measures is used to provide a matrix risk classification. Through one case study in the UK, the project has highlighted a number of factors which could improve

2 McMurray, G. (2008). *Wave Energy Ecological Effects Workshop: Ecological Assessment Briefing Paper*. In C. E. Tortorici (ed), "Ecological effects of wave energy development in the Pacific North West: A scientific workshop". NOAA Technical Memorandum NMFS-SPO-92.

3 Wilhelmsson, D., T. Malm, J. Tchou, G. Sarantakos, N. McCormick, S. Luitjens, M. Gullström, J.K. Patterson Edwards, O. Amir and A. Dubi, (eds (2010). *Greening Blue Energy: Identifying and managing the biodiversity risks and opportunities of offshore renewable energy*. Switzerland: IUCN

4 CAMIS (2013). *Risk of Marine Pollution in the Channel*, page 9. Available at: https://camis.arcmanche.eu/stock/files/user4/230_camis_securite_maquette_UK_BD_page_page.pdf

5 CAMIS (2013). *Declaration of intent of the English Channel local and regional government organisations on shipping incidents and maritime pollution, Caen, 20th March 2013*. Available at: https://camis.arcmanche.eu/stock/files/user4/Declaration_Franco_Britannique_Securit_Maritime_Mars2013_2.pdf

6 See ARCOPOLplus video at http://vimeo.com/74646735

fisheries management within designated areas:

- accurate maps showing the clustering of different types of fishing activity are an important tool for the implementation of marine policies, development of marine spatial plans and to reduce conflict in the marine environment;
- information on fishing effort provides an insight into where pressures and impacts on the marine environment are most intense;
- it is important to know how the implementation of spatial management measures may affect the industry;
- such knowledge can be used to attempt to reduce conflict between stakeholders in the area.

The project also identifies that Vessel Monitoring Systems cannot track vessel under 12m, which makes mapping difficult. A repeatable methodology using existing data was developed to address this problem. Map analysis may prove useful in developing a risk-based approach to the management of UK MPAs network.

Managing Issues of Environmental Quality

A number of projects have considered environmental quality management issues. For example, the PORTONOVO project has developed a decision-making tool together with creation of a standard method for the management of water bodies in ports. Likewise, the SETARMS dredging project has raised a number of recommendations which can be grouped under two main headings – governance tools and environmental issues[7].

Governance tools

The multiplicity of international bodies, European and French related to dredging shows the complexity of this issue for which there is no short term solution. The sharing of knowledge and good practices was identified as vital by SETARMS, and a number of working groups have been created to that end. Monitoring of feedback from the different European countries in respect of sediment recovery was also highlighted as valuable, helping to identify areas of best practice.

Environmental issues

- Keep the watch on upcoming regulatory developments.

SETARMS identified that legislation is becoming more restrictive in both how and where sediments are disposed of. Changes and developments in legislation therefore need to be monitored as these will have an impact on dredging activities.

- Anticipation and planning of dredging

The preparation of management plans for dredging is critical to provide a vision over the long term for dredging operations, and to anticipate/identify the interactions between dredging activity and marine protected areas. Port planning for dredging operations need to take into account the whole geographical area of the port, including the furthest areas it extends upstream, in order to identify the different types of sediments deposited in the port, their chemical content, as well as their potential impact on biodiversity. A management plan will also allow to better involve the public and stakeholder associations.

As part of the planning process, the identification of areas where dredging presents an environmental risk needs to be taken into account, in order to develop adapted solutions in those areas. Furthermore the potential for ports to group together and pool resources by, for example, jointly funding the acquisition of new equipment, sharing best practice for dealing with specific problems, or identifying the requirements of new regulations, should also be explored.

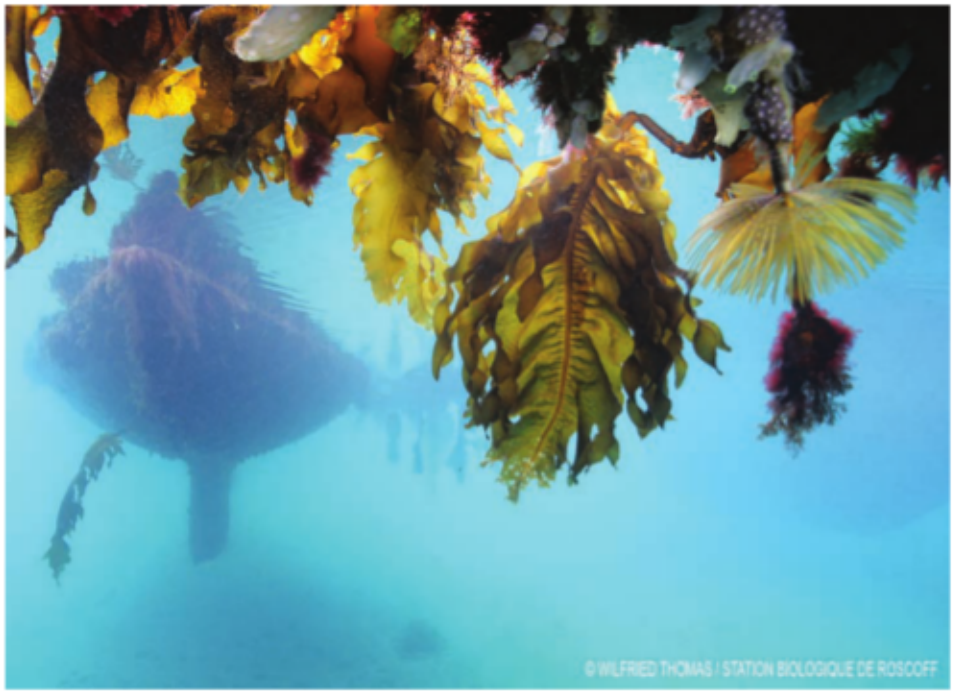
7 See APLM - IN VIVO (2013). *Etude de la réglementation sur les opérations de dragage – Vol 2: enjeux environnementaux* and APLM - IN VIVO (2013). *Etude de la réglementation sur les opérations de dragage – Vol 3: outils de gouvernance*

• Control of pollution sources

With increasingly stringent regulatory constraints, the prevention of solid and liquid pollution remains an important issue. The prevention of pollution in areas of dredging would result in improvements in water quality. SETARMS highlighted that port basins can be subject to different types of pollution due to port activities, car parks and industries located within them, but also to upstream pollution sources when ports are located on rivers. Along with the pursuit of the implementation of adapted collection and treatment systems, the improvement of surface water quality must therefore be carried out at two scales: at the watershed scale, with the involvement of managers of ports in the Water Framework Directive River Basin Management Plans[8] (renamed SAGE in France), and at the harbour scale, where all activities should be taken into account.

• Macro-waste management

SETARMS identifies that prevention remains the most effective solution to limit the volume of macro-waste collected at the same time as dredging sediment. Consequently, raising awareness about the impact of dumping waste, together with provision of facilities to dispose of waste appropriately, is essential. Raising awareness might be done either by providing information around the port, or through meetings with the port boards. The establishment and maintenance of infrastructure for the collection of waste in ports must also be conducted in a concomitant way.



Invasive kelps Undaria pinnatifida growing on a floating marina pontoon (foreground) and on a vessel hull (background). (© Wilfried Thomas / Station Biologique de Roscoff)

• Control of invasive species

The Marinexus project has examined the role of maritime transport in the dissemination of non-native species in the Channel and highlighted that artificial habitats provided by harbours and marinas are inhabited by numerous non-native species (macroalgae, invertebrates, or plankton)[9]. Cross-channel and coastal navigation between harbours facilitates the spread, and possibly primary introduction, of these non-native species, particularly via ballast tanks and boat hulls (especially leisure boats). Awareness raising and education of harbours managers and boat owners appears a priority if we want to (1) effectively monitor the spread of invasive species and (2) respond to the problem. One of the outputs of Marinexus is an identification guide of non-native species for the English coast of the Channel,

8 European Commission. *River Basin Management Plans 2009-2015 – Information on availability by country*. Available at: http://ec.europa.eu/environment/water/participation/map_mc/map.htm

9 Marinexus (2010). *Marinexus, our shared sea: mechanisms of ecosystem change in the western Channel*. Progress report # 1 - 6. Ref: 1956 / 4073

and a similar guide will be produced for the French coast as one of the outputs of the PEGASEAS Project communication and dissemination action. Exhibitions were also produced for the general public during the Marinexus project, and new ones will be created that will target port managers and boat owners. In combination with awareness raising activities, practical measures such as periodic hull scraping should be encouraged to limit the transport of non-native species. Finally, ratification by the UK of the 2004 Ballast Water Convention[10] should be encouraged (France ratified the convention in 2008) to minimize the risk of invasive species larval transport.

CONCLUSIONS/WORK LEADS

Drawing from the above discussion the following conclusions and work leads are particularly worthy of attention:

Managing Emergent Technologies
Environmental effect assessments (including both positive and negative effects), should be part of any emergent technology development schemes. More research is needed, in particular, to compare the environmental impacts at MRE development sites using collocation of different technologies, synergies with fisheries and aquaculture, or habitat restoration, with the environmental impacts at MRE sites not using such approaches.

Managing issues of marine pollution from ships
Continued development of databases looking at past pollution incidents (for both oil and chemical spills), including the environmental impacts of substances on the marine environment, will provide useful tools for pollution response activities such as those carried out by the European Maritime Safety Agency through its operational tasks[11]. Identification of areas and ecosystems at high risk of damage from spills, vessel tracking systems for high-risk cargoes, and weather and tidal forecasting are just some of the factors that need to be taken into account. The tools developed by CAMIS and ARCOPOLplus will prove very helpful in dealing with such spills and further research should be undertaken into how they could be used more widely, and by which organisations.

Managing Ecosystems within designated conservation areas
PANACHE has already identified a number of areas where activities such as fishing can be better managed in designated conservation areas. The project has currently undertaken case studies on the UK Channel coast. The project is ongoing and further outputs will be presented in due course, opening up further areas of research into the applicability of its methods and tools in other parts of the Channel and different types of conservation areas.

Managing Issues of Environmental Quality
Dredging ensures the accessibility and safety of waterways. It may also be a source of sand and gravel with an economic value. The dissemination and disposal of dredged sediment on the seabed can however disrupt the marine life through the modification of the habitat (bathymetry, sediment type, modification/destruction of benthic fauna) and the trophic network[12]. The SETARMS project led to the research of sustainable solutions for the dredging of the local ports of the Channel.

10 International Maritime Organization (undated). *International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004*. For further information see: http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx

11 European Maritime Safety Agency (undated). *Operational Tasks*. Available at: http://www.emsa.europa.eu/operations.html

12 Marmin S. (2013). *Impacts biosédimentaires des expérimentations de clapages en baie de Seine sur la communauté des sables moyens propres à Nephtys cirrosa*. PhD Thesis, Université de Caen, 249p.

The conducted studies proposed possible opportunities for future research, including assessing the most appropriate period in which to undertake the dredging activities. It also proposed the development of methods (1) to better identify the toxic substances in dredged sediment and (2) to determine ways to minimize environmental impacts when collecting sediment. Port authorities are already working to reduce the impacts of dredging activities through environmental monitoring to measure the dredging impacts and assessing the performance of the proposed measures to suppress, reduce or compensate those impacts by:

- providing a baseline against which any change to the initial state of the environment can be measured
- using real time monitoring
- assessing the mid or long term impacts of extraction and immersion operations on the marine fauna and flora.

As far as non-native species are concerned, additional research is also needed to better understand the mechanisms of biological invasions and to define actions that could be taken to reduce their spread or minimise their impacts.

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