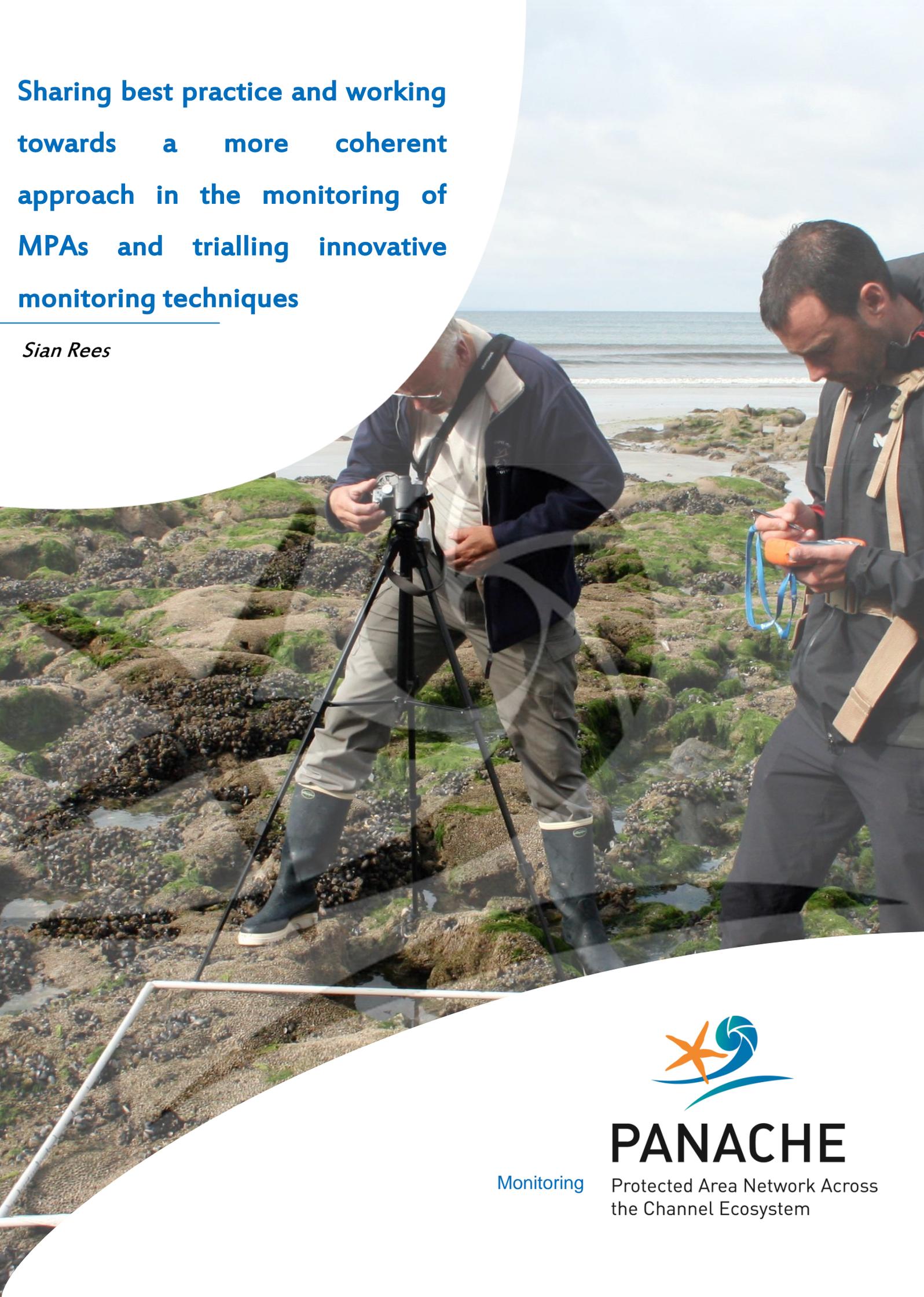


Sharing best practice and working towards a more coherent approach in the monitoring of MPAs and trialling innovative monitoring techniques

Sian Rees



PANACHE

Monitoring

Protected Area Network Across the Channel Ecosystem

Sharing best practice and working towards a more coherent approach in the monitoring of MPAs and trialling innovative monitoring techniques

Synthesis Report Monitoring

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Sharing best practice and working towards a more coherent approach in the monitoring of MPAs and trialling innovative monitoring techniques.

Synthesis Report

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ABSTRACT

One of the core objectives of the PANACHE project was to undertake a Work Package that could potentially build greater coherence in the way that Marine Protected Areas (MPAs) are monitored in the Channel region. It was recognised that monitoring the ecological change in response to MPA management alongside the associated socio-economic impacts of MPAs is important to underpin decision support mechanisms for resource use and to ensure that the MPA is successful in protecting the conservation features for which the site was originally designated. The PANACHE project facilitated scientific exchanges of experts to determine how the results and techniques of existing monitoring programmes can be shared to give a greater overall indication of how MPAs in the Channel are impacting humans and biodiversity. Specifically, four MPA monitoring approaches were trialled under this framework between French and English partner organisations. These monitoring studies include 1) a comparative study of towed video methodology to monitor benthic habitats in MPAs; 2) Marine birds survey and MPA monitoring; 3) The use of socio-economic indicators to monitor the effects of MPAs and 4) Use of multibeam echosounder surveys in relation to designating and managing Marine Protected Areas. The PANACHE project has provided a unique opportunity to trial and test methods to further our understanding, expertise and capacity to deliver MPA monitoring in England and France. Working at the Channel scale has also focused monitoring outputs on delivering information that is transferable and able to support the overarching policy frameworks. As we now move from an intensive phase of MPA designation to a period of management and monitoring it is imperative that capacity continues to be built between England and France to support statutory monitoring requirements; that methods continue to be explored so that they may be scientifically rigorous, relevant to management, cost effective and able to underpin the ecosystem based management of our marine environment.

KEYWORDS: Towed Underwater Vehicle, socio-economics, Multibeam, birds.

RÉSUMÉ

Un des objectifs principaux du projet PANACHE devait mettre en œuvre des pratiques et actions en faveur d'une approche plus cohérente du suivi des AMP en Manche. Il a été reconnu que le suivi de la biodiversité pour la gestion des AMP associé à celui des impacts socio-économiques liés à l'AMP sont importants dans l'aide à la décision pour l'affectation budgétaire mais aussi pour assurer le succès des fonctions de conservation pour lesquelles le site a été à l'origine désigné. PANACHE a permis les échanges entre experts scientifiques autour des résultats et techniques existantes pour évaluer l'impact de l'existence d'AMP en Manche sur la biodiversité et l'impact socio-économique. Ainsi, quatre types d'approches ont été testés entre des organisations partenaires françaises et anglaises : 1) une étude comparative de méthodologie vidéo remorquée pour examiner les habitats sous-marins des AMP; 2) un suivi des oiseaux marins ; 3) l'utilisation d'indicateurs socio-économiques pour contrôler les effets des AMP et 4) l'utilisation de l'échosondeur multifaisceaux pour la gestion et la désignation des AMP. PANACHE a fourni une occasion unique pour tester des méthodes et offrir des stratégies de gestion et de suivis des AMP cohérentes en Angleterre et en France. A l'échelle de Manche, le travail s'est aussi concentré sur la production de livrables qui sont transposables et capables de soutenir les différents cadres réglementaires. Après une phase intensive de désignation d'AMP, nous abordons aujourd'hui une période active de définition de leurs modalités de gestion. Aussi, il est primordial que les stratégies soient co-construites entre la France et l'Angleterre afin de répondre aux exigences communes statutaires. Des protocoles cohérents doivent continuer à être explorés pour qu'ils puissent être scientifiquement rigoureux, pertinents pour la gestion, financièrement acceptables et capable de répondre à la conservation des écosystèmes marins.

MOTS-CLÉS : liste de mots-clés, en français, séparés par des virgules



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I. Introduction

One of the core objectives of the Protected Area Network across the Channel Ecosystem (PANACHE) project was to undertake a Work Package that could potentially build greater coherence in the way that marine protected areas (MPAs) are monitored in the English Channel (La Manche). It was recognised that monitoring ecological change in response to MPA management alongside the associated socio-economic effects of MPAs is important to underpin decision-support mechanisms for resource use and to assess whether MPAs are successful in protecting the conservation features for which they were originally designated. At the time of the project initiation, England and France were both developing ways to effectively monitor MPAs, but there was little transnational coherence. It was recognised that in order to work towards a network of MPAs that is activity supporting biodiversity and the associated provision of ecosystem services in the Channel then it was imperative that monitoring techniques could be transferable and designed so that they were able to adequately inform management and policy review at a national level and were efficient, sustainable and comparable across the region.

To work towards this common objective, the PANACHE project facilitated scientific exchanges of experts to determine how the results and techniques of existing monitoring programmes could be shared to give a greater overall indication of how MPAs in the Channel are impacting biodiversity and humans. Specifically, four MPA monitoring techniques were trialled under this framework between French and English partner organisations. These monitoring studies include 1) a comparative study of towed video methodology to monitor benthic habitats in MPAs; 2) Marine bird survey and MPA monitoring; 3) The use of socio-economic indicators to monitor the effects of MPAs and 4) Use of multibeam echosounder surveys in relation to designating and managing Marine Protected Areas. This report provides a synthesis of these monitoring trials.

II. The monitoring studies

2.1 A comparative study of towed underwater video methodology to monitor benthic habitats in Marine Protected Areas

2.1.1 [Partners](#)

This study is a collaboration between Plymouth University, Institut français de recherche pour l'exploitation de la mer (Ifremer) and the Sussex Inshore Fisheries and Conservation Authority (Sussex IFCA)



2.1.2 [Overview](#)

Underwater imagery studies are increasingly being used to identify vulnerable communities and ecosystems and help designate and manage MPAs. This method also provides a valuable range of tools that can be used to assess many descriptors of the Good Environmental Status in European waters. This study tests the use of towed underwater video (TUV) systems as effective, non-destructive and efficient techniques for the monitoring of marine ecological features within these especially sensitive areas. Three technically different towed video sledges were tested on different seabed types (rocky, mixed ground and sandy) in the same MPA, Kingmere Marine Conservation Zone, West Sussex, UK. Each sled was assessed to compare the different characteristics, strengths and limitations of each device with the aim of providing recommendations on their future use and comparability of data between different systems. Heavy frames are more adaptable in all kind of depth and sea conditions but proved difficult to operate on irregular grounds and were found to significantly impact the seabed. Significant differences in terms of species richness, densities or cover as well species composition were highlighted and are believed to be due to the deployment limits of each gear as well as difference in their optical specifications. Good lighting intensity, and the use of HD resolution are believed to increase the taxonomic power of the video footages. As a result from this study, particular care should be given to sledge and optics specifications when developing a middle or long term MPA monitoring programme.

2.2 Marine birds survey and MPA monitoring

2.2.1 [Partners](#)

This study is a collaboration between The Royal Society for the Protection of Birds (RSPB) and the Agence des aires marines protégées (AAMP).

2.2.2 [Overview](#)

Seabirds are at the top of the marine food chain and are therefore an essential part of the functioning of marine ecosystems and can be used to assess the environmental status of the marine environment. They are an integral part of the protective measures taken by the European Union, through the OSPAR Convention, the Marine Strategy Framework Directive (MSFD) and Natura 2000. Whilst there are MPA designations in England and France that provide legal protection for seabirds there is a need to increase the number of surveys of seabirds in and around Channel MPAs, to gain an up to date picture of numbers, productivity and potential anthropogenic impact on both sides of the Channel in order to inform management planning. This monitoring case study has two key aims firstly to develop a harmonised approach to assessing breeding and wintering bird numbers (and their state of conservation) across a sample of Channel MPAs and surrounding areas; and secondly to gain a greater understanding of the numbers and distribution of seabirds within and around MPAs and to help determine issues affecting birds that will guide management requirements for MPAs. Several studies were coordinated across the channel these include



a study on Kittiwake (*Rissa tridactyla*) to better understand the breeding population, the breeding success rate and telemetry tracking to determine preferred habitats. Surveys of breeding birds were also undertaken for Shags (*Phalacrocorax aristotelis*), Great Cormorants (*Phalacrocorax carbo*) and four species of tern, Sandwich Tern (*Thalasseus sandvicensis*), the Roseate Tern (*Sterna dougallii*), the Common Tern (*Sterna hirundo*), and the Little Tern (*Sternula albifrons*). To better understand human impacts and disturbance a study was undertaken to define and assess the levels of disturbance by water craft (motorised or manually propelled) on Guillemots. Targeted MPA studies were undertaken in England and France to count numbers of Black-throated diver (*Gavia arctica*), the Great Northern diver (*Gavia immer*) and the Red-throated diver (*Gavia stellata*), and four species of grebe: the Great Crested Grebe (*Podiceps cristatus*), the Red-necked Grebe (*Podiceps grisegena*), the Slavonian grebe (*Podiceps auritus*), and the Black-necked grebe (*Podiceps nigricollis*) in order to assess the importance of the MPA to the population. These studies provide new information on how birds are using MPAs and the surrounding areas. This information will guide management to safeguard these species into the future. It has also helped identify potential new MPA sites, for example, in France, the data collection on grebes and divers has enabled a verification of the coherence of the Natura 2000 MPA network for these species whilst also demonstrating that the wider MPA network is currently not supporting these species. Generally, data are still lacking offshore, where further surveys will help direct management of designated sites and potentially identify new important foraging or wintering areas.

2.3 Methods for monitoring the socio-economic effects of MPAs

2.3.1 Partners

This study is a collaboration between Plymouth University, the Port Dunkerque and the World Wide Fund for Nature (WWF).

2.3.2 Overview

Recent legal and policy developments require an assessment of social, economic and cultural effects of (MPAs) on local communities and marine and coastal stakeholders accurately and cost-effectively. This study trials a new marine protected area (MPA) socio-economic assessment system based on a mixed methods research design. The study included three phases. Phase 1 comprised of a literature review to identify a set of potentially relevant socio-economic variables and stakeholder categories in Europe. Phase 2 comprised of an online survey among the main marine and coastal organisations in the UK and France to gather their perceptions of MPAs and their ratings of potential socio-economic variables for monitoring socio-economic effects of MPA designation and management. Phase 3 utilised publicly available official statistics on those variables (or proxies) in a Multiple-Paired-Before-After-Control-Impact analysis to assess the socio-economic effects of 6 case study MPAs in the PANACHE project area. A set of 14 socio-economic variables for which data were available was identified. Eight of them were community-scale variables,



whereas 6 of them were sectorial variables related to fishing. No evidence of community-scale effects from our sample of MPAs was found, whereas effects were apparent on most fishing-related variables and also stated by some of the stakeholders surveyed. In general, surveyed environmental NGOs, research centres, local councils, MPA managers and statutory nature conservation bodies in the UK and France perceived MPAs as positively affecting them, whereas surveyed fishers' organisations, the industry (shipping and aggregate) and recreational organisations perceived MPA effects mostly negatively. The findings suggest that future MPA socio-economic assessments should focus on effects on specific stakeholders rather than on the broader community. However, results should be handled with care due to the non-random selection of the sample of organisations and MPAs in this study, the low sample sizes of some variables (e.g. fishing-related ones), the possible effects of confounding variables and the likely masking effect of delayed management of the selected MPAs.

2.4 Use of multibeam echo sounder surveys in relation to designating and managing Marine Protected Areas

2.4.1 Partners

This study is a collaboration between the Port Dunkerque and Dorset Wildlife Trust

2.4.2 Overview

This study examines the use of multibeam echosounder survey (MBES) as a tool for designating and managing MPAs through two case studies. The first looks at how MBES data, often collected for other purposes, influenced site selection and boundary decisions during marine Special Area of Conservation and Marine Conservation Zone designation in English waters of the Channel and how MBES has been used to support management of marine protected areas, from mapping of protected features to raising awareness and public support. The second case study looks at using repeat MBES surveys to detect morphological change in sediment habitats on the French Channel coast. The high cost of collecting MBES, mostly due to ship time, means that collaboration between agencies collecting MBES for different purposes is necessary, with the caveat that data from hydrographic surveys may have less than optimum quality backscatter information, which can reduce the value of the data for delineating seabed habitats and therefore for detecting change in condition or extent of conservation features.

III. Transferability

All case study partners were asked to fill in a common questionnaire as part of their technical study to examine the transferability of the case study method and to couch the results in terms of future use in the Channel.



Question 1: At what level can this method be used?

	Towed video	Birds Survey	Socio-economics	Multibeam
Site level	✓	✓	✓	✓
National	✓	✓	✓	✓
European	✓	✓	✓	✓
International	✓	✓	✓	✓

In the feedback given by the project partners it was considered that the data collected was relevant at a variety of scales. All the methods were trailed at a site level under the PANACHE project. The multibeam study included a national perspective of the use of this method with regard a regional MPA planning process in the UK. Both the birds study and socio-economics study applied their method at the national and European scale with the view to the data collected potentially feeding into wider marine planning processes and statutory reporting. The bird study particularly aimed to combine local level monitoring through regional NGOs (or local office) with the national/international perspective to reporting on ecological coherence of the MPA network for supporting this species. The towed video case study partners commented that if the same methods were applied across similar habitats then data would be relevant across all scales. Multibeam as a method for MPA site selection is relevant at an international scale if percentage targets for broad scale habitats are to be met as the method provides a means of determining bathymetric variation at different spatial and temporal scales. Though, in this case study its use in monitoring a mobile feature (sandbanks) in a busy port was considered to be its most effective use. It was noted that specific calibration of the equipment at a site level perhaps limits its broader use across boundaries.



Question 2: Can the methodology be transferred to different MPA sites as a monitoring tool?

	Towed video	Birds Survey	Socio-economics	Multibeam
Method transfer	✓	✓	✓	✓

The project partners considered that each of the methods tested at a site level could be transferred to other sites. Both the multibeam and towed video methods are suitable for specific habitat types. For example multibeam will show little variation in predominantly rocky sites. The bird case study noted that whilst the methods applied were different for each species it is important to apply the same species specific method at each site. The socio-economic method for monitoring MPAs would require a consistent time-series of socio-economic data to be compiled at a local level, though the qualitative study could be transferred to other situations and contexts.

Question 3: How does this method and the data fit with/inform existing MPA monitoring programmes in the UK and France?

From a statutory perspective there is no requirement to monitor socio-economic indicators though it is widely recognised in MPA management that socio-economic factors must be taken into account to support effective conservation of the designated habitats and features. By using nationally collected statistics this method provides a cost-effective means of monitoring socio-economic variables. In terms of the use of multibeam it is predominantly used as a tool to specifically monitor features where there is a statutory reporting requirement. The TUV method is currently used in England and France to provide relevant information for monitoring programmes. This study provides advice on the appropriate equipment selection and observations on data sharing between organisations and countries. The methods trialled for the bird case study specifically fills a need for data (e.g. bird numbers, productivity) to feed into national and EU statutory reporting requirements.

Question 4: What are the current similarities/differences between how the method is used in the UK and France?

The birds case study specifically trialled common methods though in some cases the method was only tested on one side of the Channel. This process revealed that, in England, data collection for birds is undertaken by one national body working on the whole coast. Whilst in France several organisations undertook the monitoring surveys which meant the scope was more limited on the English side. The use of TUV data is used in both the UK and France to enumerate benthic assemblages and inform MPA management and feed into statutory monitoring requirements. For this case study the partners specifically focused on the differences in gear types (impact, cost, usability) to enable the use of this method to be refined as a monitoring tool. The socio-economic study trialled an innovative method for monitoring effects of MPA designation and management measures on socio-economic variables. The method is



not currently in use in the UK and France but this case study trial demonstrated that there is a lack of consistent data on the socio-economic variables of interest at the required scale, especially in England. The partners involved in the multibeam case study noted that multibeam surveys are regularly undertaken in England and France though interpretation of the results for ecological purposes is often opportunistic. Bathymetric and backscatter data collected by UK Civil Hydrography Programme in the UK is now subject to an Open Government Licence. A development that aims to reduce the cost burden, encourage collaboration and data sharing. Whereas centrally gathered multibeam data in France remains restricted access.

Question 5: From this collaborative study please make recommendations as to how this methodology and the data collected could be used by MPA managers at English and French MPA sites.

The birds survey design were based on published methods (available in the full report). The project partners note that it is important that these methods are used in future studies monitoring seabirds in and around MPAs to ensure comparability of data. Looking to the future application of these methods the partners state that a regular broad scale assessment of seabird status across the Channel area in relation to MPAs would be valuable in future years supported by local regular monitoring at specific MPAs to assess the effectiveness of management measures at the site level. The towed video project partners recommend that if this method were to be used in a comparative study at French and English MPA sites then either the TUVs would need to be of identical specifications and/or the machines are calibrated before analysis. The partners involved in the socio-economic case study note that in order for this method to be used effectively by English and French MPA managers then local scale variables are most appropriate, targeted to specific/interested stakeholders.



Question 6: How much has this study cost?

	England	France
Towed video	Sussex IFCA €16,285 (staff time and travel) Plymouth University €18,234 (staff time and travel)	Ifremer €186,182 (costs include purchase of equipment)
Birds Survey	Total volunteer time: £9,398 (at £6.19/day). Plus 105 days of Torbay Coast and Countryside Trust volunteers. Boat hire (daily costs). £900 (£150/day, 6 days) Total staff time: £3,631	Great cormorant: 30100€, colonies all along the French coast Shag: 35240€, colonies all along the French coast Terns: 15390€, colonies all along the French coast Divers and grebes: 27800€, all along the French coast Kittiwake: 21100€, colonies all along the French coast Kittiwake telemetry: 100 600€, for three colonies
Socio-economics	£14,400	
Multibeam	No information provided	No information provided

The following costs were provided by the project partners. Please note that some costs represent collaborations with partners outside of the PANACHE project.

Question 7: How is this method cost-effective for monitoring MPAs? Please also suggest ways this methodology can become more cost efficient.

No costs were provided by the multibeam partners though they noted that the use of multibeam can rapidly provide detailed and precise bathymetric maps of large areas. It is possible to highlight the morphology of the seabed with an accuracy of one metre. This PANACHE multibeam case study has shown that this method can enable the identification of different sediment types thus reducing the need for expensive sediment and biological samples and the associated laboratory costs. The method is most cost-effective where ecological surveys are combined with routine bathymetric surveys and where data collected with public funds are accessible under an open licence. The birds case study costs demonstrate the costs of detailed monitoring surveys. It is possible to make the method more cost effective by connecting with local specialised NGOs who are already operating in the field and making use of volunteer expertise (citizen science). The towed video project partners noted that, after the initial purchase of equipment, the methods are extremely cost-effective for monitoring MPAs. Kilometres of sea bed can be recorded per day in a repeatable and robust way. Recorded data can also be used for multiple functions and, if stored, provide an



ecological historical catalogue that can be used for future purposes. In future, benthic monitoring may become more cost effective through the use of Automated Underwater Video or automated video analysis. However, both of these applications are still in development, whereas the towed underwater video systems are currently fit for purpose and effective tools for monitoring MPAs. They continue to become more cost efficient through advances in technology and deflating hardware and data storage costs. The socio-economic study proved to be cost-effective due to the use of nationally available statistics, online data collection via surveys and computer-assisted analysis of spatial data using geographic information systems.

Question 8: How was information and expertise exchanged between partners?

The PANACHE project provided a unique forum for scientists and MPA managers across the Channel to share information and expertise with regard to MPA monitoring. All project partners followed a model of information exchange via e-mail, telephone calls and online conferences. These were supported by working group meetings convened:

- 1st Meeting Le Havre Nov 2011
- 2nd Meeting Le Harve November 2012
- 3rd Meeting Plymouth March 2013
- 4th Meeting Boulogne-sur-Mer November 2013
- 5th Meeting Dover March 2014
- 6th Meeting Jersey October 2015

All project partners (except Multibeam) took part in cross channel exchanges to undertake fieldwork.

Question 9: How has this collaboration built capacity within your organisation for monitoring MPAs?

The PANACHE project has formed important connections between organisations and countries so that future MPA monitoring can be undertaken in collaboration and in a more effective way. The towed video project partners state that they have made useful relationships that they plan to use for future collaborative grant opportunities. They have built capacity as the expertise from the different organisations and countries was also varied. Therefore the science underpinning the monitoring method is stronger as a result of the collaboration. The funding for this study provided the unique opportunity to test the impact of research equipment on the environment. This has helped to develop the method so it may become a cost-effective, time-effective and non-destructive equipment to monitor MPAs across the channel and further afield. Project partners involved in the birds study state that the PANACHE project has supported institutional capacity to monitor birds and provided useful data and information to progress monitoring and management in and around MPAs. The project has facilitated new cross channel partnerships and contributed valuable data to work towards an ecologically coherent network of MPAs that supports birds. From the perspective of the socio-economic case study partners the collaboration enabled by PANACHE has greatly furthered knowledge and built capacity to monitor the socio-economic effects of MPAs.



	Towed video	Birds Survey	Socio-economics	Multibeam
Built capacity	✓	✓	✓	✓
Supported ongoing monitoring programmes		✓		✓
Enabled innovation	✓	✓	✓	✓
Provided new data	✓	✓	✓	✓
Enabled new partnerships	✓	✓	✓	✓
Prompted future ideas	✓	✓	✓	

Question 10: How can this collaboration be developed in the future?

The towed video project partners are interested in building on these PANACHE collaborations in the future to answer research questions with regards to MPA science. Future collaboration will enable scientists to undertake robust science that examines data from multiple MPA sites across borders rather than single site specific surveys. The partners from the birds monitoring study see future collaboration as essential to build on the knowledge developed and shared via PANACHE. The development of a common database to collate data from all the varied sources on cross channel bird species would be a vital next step. From the socio-economic study perspective the authors noted that a partnership with data-collecting bodies, such as the Office for National Statistics, would be advisable to set long-term compilation of multi-purpose socioeconomic data at a local scale

IV. Conclusions

The need to monitor ecological change in response to MPA management alongside the associated socio-economic effects of MPAs is important to underpin decision support mechanisms for resource use and to facilitate that the MPA is successful in protecting the conservation features for which the site was originally designated. The PANACHE project has provided a unique opportunity to trial methods to further our understanding, expertise and capacity to deliver MPA monitoring in England and France. Working at the Channel scale has also focused monitoring outputs on delivering information that is transferable and able to inform the overarching policy frameworks. As we now move from an intensive phase of MPA designation to a period of active management it is imperative that capacity continues to be built between England and France to support statutory monitoring requirements; that methods continue to be explored so that they may be scientifically rigorous, relevant to management, cost-effective and able to underpin the ecosystem based management of our marine environment



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PANACHE

Protected Area Network Across
the Channel Ecosystem

PANACHE is a project in collaboration between France and Britain. It aims at a **better protection** of the Channel marine environment through the **networking** of existing marine protected areas.

The project's five objectives:

- **Assess** the existing marine protected areas network for its ecological coherence.
- **Mutualise** knowledge on monitoring techniques, share positive experiences.
- **Build** greater coherence and foster dialogue for a better management of marine protected areas.
- **Increase** general awareness of marine protected areas: build common ownership and stewardship, through engagement in joint citizen science programmes.
- **Develop** a public GIS database.

France and Great Britain are facing similar challenges to protect the marine biodiversity in their shared marine territory: PANACHE aims at providing a **common, coherent and efficient reaction**.

PANACHE est un projet franco-britannique, visant à une **meilleure protection** de l'environnement marin de la Manche par la **mise en réseau** des aires marines protégées existantes.

Les cinq objectifs du projet :

- **Étudier** la cohérence écologique du réseau des aires marines protégées.
- **Mutualiser** les acquis en matière de suivi de ces espaces, partager les expériences positives.
- **Consolider** la cohérence et encourager la concertation pour une meilleure gestion des aires marines protégées.
- **Accroître** la sensibilisation générale aux aires marines protégées : instaurer un sentiment d'appartenance et des attentes communes en développant des programmes de sciences participatives.
- **Instaurer** une base de données SIG publique.

France et Royaume-Uni sont confrontés à des défis analogues pour protéger la biodiversité marine de l'espace marin qu'ils partagent : PANACHE vise à apporter une **réponse commune, cohérente et efficace**.

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