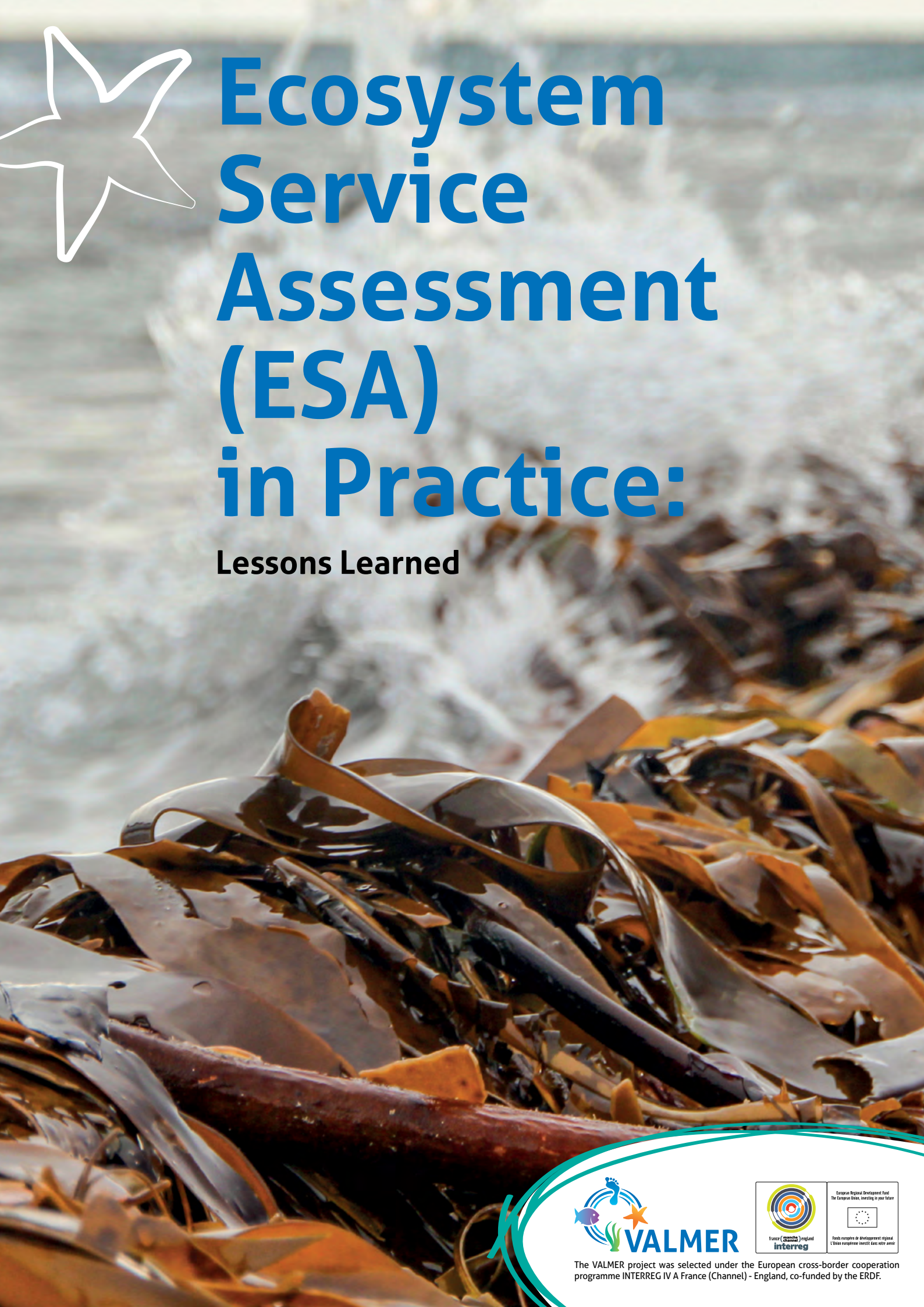
Ecosystem Service Assessment (ESA) in Practice:

Lessons Learned



VALMER

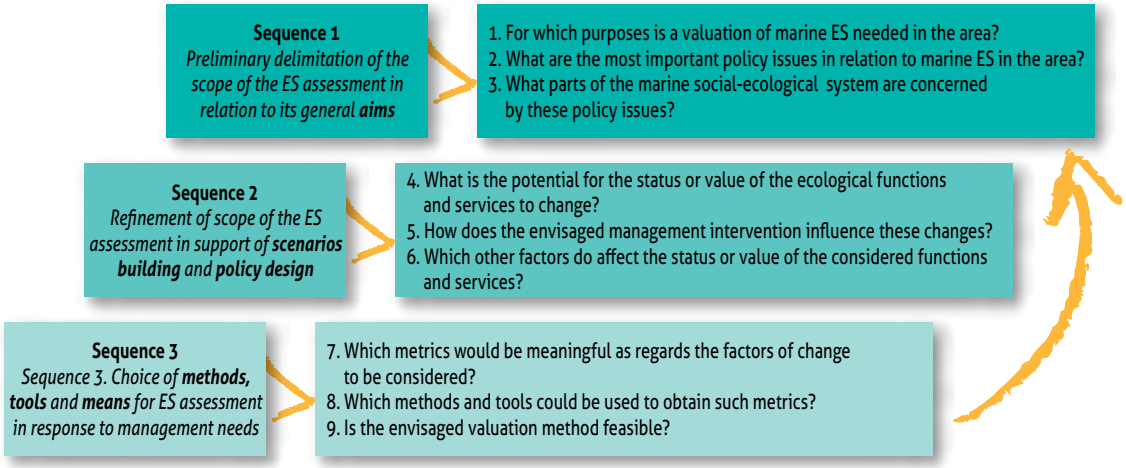
The VALMER project was selected under the European cross-border cooperation programme INTERREG IV A France (Channel) - England, co-funded by the ERDF.

Lesson Learned 1: A structured approach supports effective ESA

Why: Ecosystem service assessments (ESA) are increasingly recommended to inform marine policy and planning. However, ESA can require significant time, effort, and expertise, are unevenly applied and rarely used effectively in decision-making processes. It is thus necessary to ensure from inception that ESA approaches are efficient, transparent and provide the right information for purpose.

How: A strategic decision-making approach, called a Triage, was developed to support operational marine management. The Triage includes three transparent successive stages: i. defining the aims and scope of the assessment; ii. selecting the ES to be assessed based on three criteria; iii. choosing the assessment method. Its implementation assisted the selection of the appropriate set of ESs and the most effective methodology for assessment. It also enabled stakeholder engagement, ensuring the ownership of the process.

What next: Triage implementation in VALMER was led by researchers and project participants. When possible, the triage should be applied in a more flexible and iterative way, ideally with a facilitator leading the process so as to ensure neutrality. This would however require specific skills, especially as regards economic valuation methods and marine management issues.



Lesson Learned 2: The relevant assessment method depends on the context of use

Why: When conducting ESA in practice it is crucial to select the right assessment methodology for the right purpose, taking into account the context of use. A pragmatic decision may be informed using quick straightforward methods while long-term assessment may justify more accurate but also expensive approaches. In the context of long-term purposes, methodological innovation may be seen as a start-up investment for future uses.

How: The objective of the ESA was carefully considered at the start of the process and the methodologies selected accordingly and in discussion with the user. For example, recreational activities were assessed in two different contexts. In PH the well documented Travel Cost Method was applied providing tangible, directly useful, clear cut results. However, in the GNB, where a whole ecosystem accounting framework was developed, recreational activities assessment used an innovative methodology consisting of strictly separating ecosystem-independent activities, but also in properly valuing the means dedicated to ecosystem-dependant activities by the whole population of users. The ecosystem accounting was costly (it required a full-time researcher for 18months), but it should be now 'ready-to-use' for regular implementations in the future.

What next: Continued dialogue between academics undertaking ESA and users of these methods is essential, with improved accessible documentation of the methods, the results and the actual use of the results.

Lesson Learned 3: ESA requires effective interdisciplinary research

Why: To understand relationships between ecosystem functions, services and benefits, and how these may change under given scenarios.

How: The broad approach supported by Interreg funding was valuable in enabling scientists from different disciplines to exchange ideas through informal day to day contact and structured workshops. The project successfully built on established relationships and developed a shared vocabulary. The input from natural science was essential in supporting the social science research. The ecologists also benefited as it reinforced the societal importance of their studies, and encouraged them to work at different scales. Ecologists who focus traditionally on small scales could see how their work contributed to the "big picture", for example ecologists in GNB wanted to see how the wealth of individual studies (years of results) could be combined into a larger picture they had not seen . This strategic approach was driven by stakeholders priorities and it helped also to prioritise when the issue at stake was a problem of ES supply, for which more ecological science was needed, or a problem of ES demand, to be mainly assessed by social scientists.

What next: It would be valuable to involve a broader range of social scientists, for example environmental psychologists, to provide wider assessment of people's perceptions, health and well being. It is recommended to work with people who are more interested in the integrative dimension of the approach than in the further advances of their own scientific realms. Funding sources of interdisciplinary research are rare and should be encouraged.

Lesson Learned 4: Local scale assessments are essential

Why: To date most ESA research has been either conceptual or at larger scales (MEA, TEEB, NEA) neglecting local scale. Large ESA do not tend to address specific management issues, and hence rarely go further than awareness raising. ESA provides a clear and extensive vision of the complex issues raised by the use of marine ecosystems which fits well with the complex objectives of local marine governance.

How: VALMER aimed to address this gap in local ES knowledge and to link ESA with existing local management bodies. Case study areas and approaches were specifically designated to be useful to local managers. Initial diagnosis, thinking about trade-offs, providing data for comparing real management options, and good stakeholder relationships (building on existing and creating new) were all carefully undertaken to ensure ESA was effective at a local scale.

What next: Accurate local ESA should avoid too much complexity; local managers should acknowledge that it may not be possible to undertake the " ideal" ESA in the context of limited information and high uncertainty, but they should also recognise the potential benefits of any ESA; there are opportunities to develop tools that have a continuing life at the local scale, that may also improve the relevance and reduce the costs of braoad scale assessments.

Lesson Learned 5: Data gaps and uncertainty are inherent in all ESA but can be overcome

Why: Decisions in marine management have to be made even if data is uncertain, imperfect, missing and incomplete.

How: Certain case studies were selected as "low data" examples to explore how to manage this limitation. It was found that simple qualitative information (PSF) was enough to start structured debate about trade-offs, generating useful outcomes such as consideration of alternative options and a widened appreciation of differing perspectives. In addition, even if no decision was at stake, or just a hypothetical scenario was being explored, ESA was still useful for engaging users in the production of information (PSF). Where specific data for fine scale habitat levels was lacking amalgamating habitats into broad categories (NDBR) and considering shared characteristics provided useful information on the distribution and delivery of ES. Including stakeholders in the data discovery process highlighted sources of information which might otherwise have been overlooked (PSF, NDBR, PH). In the case of PSF data relating to carbon sequestration and valuation was used, but the uncertainty associated with this was communicated to the stakeholders through both verbal and pictorial means. In the French study cases, in order to develop a model on risks for the habitats, it was necessary to mix various sources of information, including expert judgment (GNB). An expert workshop to overcome the lack of knowledge regarding the ecological functions delivered by seagrass beds led managers to re-assess the reason why this habitat should be preserved (GM).

What next: Data gaps include knowledge on the extent and status of marine habitats, their contribution to ecological functions, and the economic data at a local scale, especially as regards the beneficiaries of ES. As the data gaps are extensive smart methods of addressing these should be employed, which could include citizen science, collaboration with existing monitoring programs, and a strategic focus on the most essential issues. It is important to continue to develop means of communicating uncertainty clearly and further research on how to do this is required.

Lesson Learned 6: Management requires approaches which are dynamic and demonstrate connectivity

Why: Most ESA are static and provide a snapshot of a specific area (Fig 1), but management challenges require consideration of interconnected dynamic processes. In addition, ESA methods are generally most effective when dealing with changes in values resulting from a variety of possible scenarios, and for understanding the trade-offs between different ES under such scenarios.

How: In most cases, stakeholder led scenario approaches (PSF, ND, GNB) were used to demonstrate qualitatively how ES provision changes under different futures (Fig 2). However, for most cases the resources did not allow for quantitative and connective scenario results as this was too time consuming and expensive to undertake. A complete system dynamic model of kelp ES provision was carried out (PNMI) but was only made possible by the large amount of available data concerning this ecosystem and its uses.

What next: Further development of models to show changes in ES provision according to pressures or management scenarios, with improved spatial and temporal resolution and scale; and more empirical research on linkages between pressures and ecological processes, and in turn between ecological processes and human activities.

Figure 1. NDBR: A snapshot of current ES provision

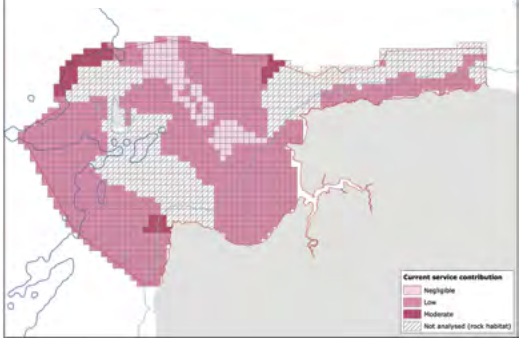
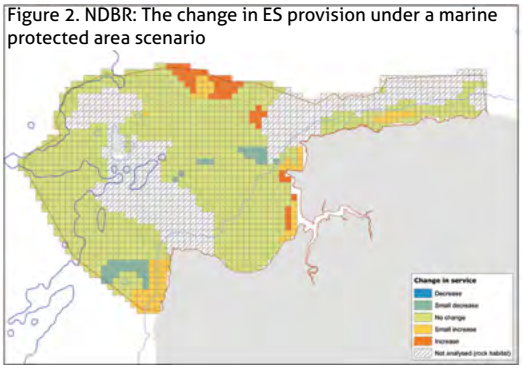


Figure 2. NDBR: The change in ES provision under a marine protected area scenario

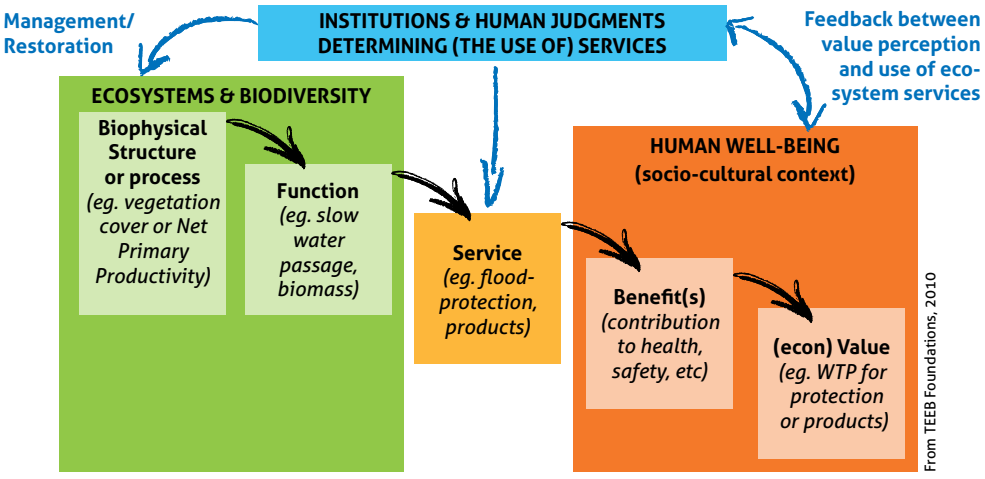


Lesson Learned 7: It is preferable to use the ES approach rather than trying to manage without this

Why: ESA provides clarity with regard to the numerous benefits received from a given ecosystem and improves transparency regarding trade-offs.

How: The ESA was successfully used to engage a wide range of stakeholders, who in most cases had minimal prior knowledge of ES. Detailed ES terminology was not helpful to communication (for example in GM ES vocabulary was deliberately avoided), but the ES concepts were excellent for illustrating the nature of shared use of a given case study area. This alone was a major success of the approach. An incomplete ESA was also recognised to be very useful. Talking about functions (with ecological vocabulary) and services (with socio-economic vocabulary) enabled scientists, managers and stakeholders to gather around the table and to find the common denominator to engage in a renewed dialogue about a management issue, for example the management of kelp forests in the PNMI.

What next: Recommended areas for future research include: i. resilience and thresholds; ii. cultural services; iii. moving from bounded marine areas to include connectivity to adjoining marine systems and terrestrial/freshwater interactions; iv. consideration of disparity between locations of service supply and location of beneficiaries, and how value of services is affected by proximity to beneficiaries, and distribution of beneficiaries and "losers"; v. finally need to improve communication of what marine ES are, ideally through case study specific illustrations.

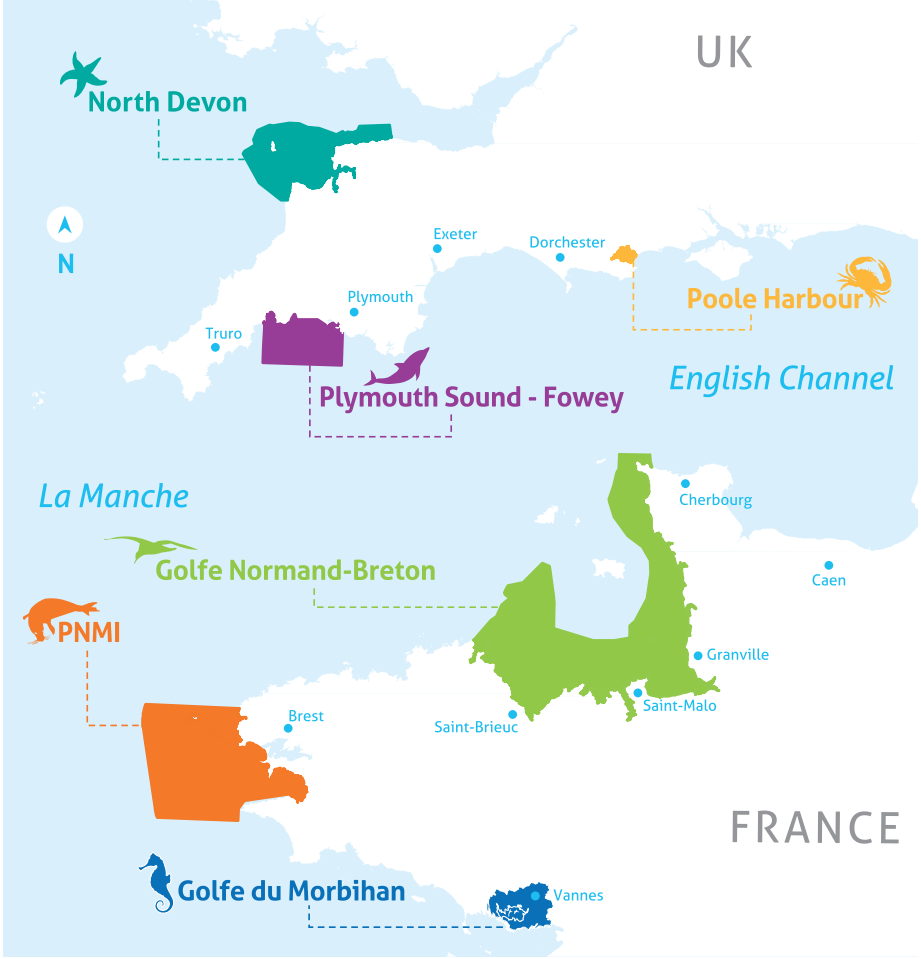


The pathway from ES structure and processes to human well-being

Conclusion

The VALMER project has left a significant legacy, not just in producing a wealth of results and data, but also with regard to improving understanding of ESA by academics, managers and stakeholders alike. Through enabling discussion and shared learning between stakeholders and with the wider academic community, the long term interactions of these groups have noticeably improved. Local managers found that their understanding of ESA issues, and the range of perceptions regarding these, were significantly enhanced through the adoption of this approach. In addition, in some cases the stakeholders have become more organised, for example through the formation of user groups and improved interaction with site managers. ESA has proved a valuable vehicle for both academic, managerial and communicative development across a broad range of case study sites and stakeholders.

There was wide variation in the ecology, management needs, objectives, and anticipated outcomes of the six case studies within VALMER, providing an ideal opportunity to compare and contrast different ecosystem service approaches.



Poole Harbour (PH) is an important recreation and tourism destination, but detailed assessments of this sector are lacking. This study focused on generating new data for six key activities in order to support recreation management. An online travel cost survey was used, with additional multicriteria analysis and supporting questions to allow wider consideration of respondent preferences. The objective of the study in the **North Devon Biosphere Reserve (NDBR)** was to raise awareness of the importance of sedimentary habitats, and to explore whether it was possible to generate ecosystem service information to support local and national management initiatives. A Bayesian Belief Network combined with a Geographic Information System was used to model and map changes in the delivery of the services resulting from possible management options. The **Plymouth Sound to Fowey (PSF)** site represented a typical stretch of open coast. The study sought to explore strategic assessments at the marine planning scale, through mapping and primarily qualitative assessment of potential changes under management scenarios. An additional study of cultural services also contained a spatial component.

Seagrass beds are an important habitat within the Regional National Park of the **Golfe du Morbihan (GM)**, and an ecosystem services approach was used to: i) raise awareness of seagrass issues; ii) support and integrated approach to management; and iii) identify management options to facilitate trade-offs. Techniques including interviews, workshops, focus groups, conceptual modelling and a choice experiment were used, and knowledge exchange and communication were key factors. The focus within the **Parc Naturel Marin d'Iroise (PNMI)** was the ecosystem services provided by kelp forests, and the objective of the assessment was to support management initiatives that would ensure sustainable yields, secure employment for harvesters, mitigate impacts on other users, and protect key species that depend on the kelp. A dynamic socio-ecological model was developed and used to simulate the impacts of different management strategies. The objective of the **Golfe Normand-Breton (GNB)** case was to provide an initial diagnosis of the ecosystem services provided by the proposed Marine Protected Area, and to anticipate future changes. A range of methods were employed, including spatial mapping and the development of matrices to link the functions of different benthic habitats to the services they produce. The InVEST model was then used to map the cumulative risks to these habitats. An accounting approach was used to describe and quantify the links between human activities and ecosystem services, and a sustainable yield for, and the economic vulnerability of, nine major commercial species was determined.

VALMER Valuing ecosystem services in the western English Channel

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

This document forms part of a complementary set of reports and recommendations from VALMER, which we suggest be read together for a better understanding of the use of ESA in marine ecosystems. All VALMER outputs are available on the project website www.valmer.eu.

With the contribution of the project partners:

Agence des aires marines protégées · Ifremer · UBO université de bretagne occidentale · UPMC Sorbonne Universités · Parc naturel régional du Golfe du Morbihan · PML Plymouth Marine Laboratory · Marine & Coastal Policy with Plymouth University · The Marine Biological Association · Cornwall Council · Devon County Council · Devon maritime forum · Dorset County Council · Dorset Coast Forum