

Impact case study (REF3)

Institution: University of Hull		
Unit of Assessment: 14 Geography and Environmental Studies		
Title of case study: Good Environmental Status of marine ecosystems: a more effective approach to the implementation of the EU Marine Strategy Framework Directive		
Period when the underpinning research was undertaken: November 2012 - November 2016		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Mike Elliott	Lecturer/Senior Lecturer Director, Institute of Estuarine and Coastal Studies Professor of Estuarine and Coastal Sciences	1991 - 2004 1996 - 2016 2004 - present
Dr Krysia Mazik	Senior Benthic Ecologist Lecturer, Marine Biology	2000 - 2018 2018 - present
Sue Boyes	Senior Marine Policy Researcher	1999 - 2019
Dr Daryl Burdon	Senior Ecological Economist	2002 - 2019
Period when the claimed impact occurred: February 2016 - present		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>University of Hull (UoH) research has led to more robust implementation of the EU Marine Strategy Framework Directive and harmonisation of monitoring approaches within EU Member States. The impact is evident through the repeal of Commission Decision 2010/477/EU and its replacement with Commission Decision 2017/848/EU, which incorporated recommendations made by UoH research and which applies to all 22 marine EU Member States (a sea area of 5.72 million km²), their overseas territories, the UK and Turkey.</p> <p>UoH research also contributed to the development of the DEVOTool software which in turn underpinned the development of software for assessing the 'Good Environmental Status'. This is now in use in the HELCOM (Baltic) Region incorporating 9 EU Member States.</p> <p>The project won the COLUMBUS Blue Society Knowledge Transfer Award (2018), recognising its contribution to the impactful application of knowledge by end-users implementing policy.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>The Marine Strategy Framework Directive (MSFD, Directive 2008/56/EC) aims to achieve Good Environmental Status (GES) of EU seas by 2020 and to protect the natural system in supporting marine-related economic and social activities. GES is defined as where the marine waters provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive. The Directive is implemented by all 22 EU Member States with marine waters, covering 5.72 million km² of sea and 68,000 km of coastline, and affects an estimated 41% of the European population. Additionally, the Directive is implemented in overseas territories of EU Member States and by Turkey. It continues to be implemented in the UK after it exited the EU.</p> <p>The original Directive came into force in 2008, and was implemented in a stepwise manner in order to achieve GES by 2020. Part of this implementation was through the Commission Decision 2010/477/EU which detailed criteria and methodological standards for achieving GES. Since that time, UoH has contributed to research (see references 1- 4) on the definition and interpretation of GES and on the development and evaluation of indicators for the assessment of GES, thereby supporting MSFD implementation. The details of this research and the UoH contribution are outlined in points i) and ii):</p>		

i) Evaluation of the Commission Decision 2010/477/EU: Elliott's research **(1, 2)** highlighted inconsistencies in the definition of GES (in terms of criteria, setting of targets, scale of assessment and practical application of the concept), together with weaknesses in the approach to implementing the MSFD. Elliott's role in these publications was in **(1)** as second author, contributing substantially to the conception of the study and to the writing and **(2)** as initiator of the study. At the request of the European Commission (EC), Elliott and Mazik jointly coordinated (with the EC Joint Research Centre) research **(3)** (co-authored by Boyes and Burdon), to identify the specific limitations of the MSFD using a critical analysis of EC legal texts to identify and clarify specific scientific and technical issues of the Directive.

In particular, the research identified that Tables 1 and 2 of the MSFD Annex 3 required clarification in terms of the categorisation of habitats, the inclusion of all European marine habitats, and in its methodological approaches to collecting geospatial data. Further, the list of anthropogenic pressures acting upon the marine environment was considered incomplete and the terminology used was inconsistent. Furthermore, the EUNIS (European Nature Information System) habitat classification required updating to facilitate implementation of the MSFD, and overall clarification of terminology and consistency of its use was needed to achieve sustainability.

Marine management requires an understanding of the human pressures on the marine environment **(3)**, together with integration of the various human uses of the sea, in order to achieve sustainability. The EU and UK Marine Strategies rely on the MSFD (for environmental quality and status) being implemented jointly with the recent Maritime Spatial Planning Directive (MSPD). Accordingly, Elliott developed a 'Best Expert Judgement'-based (BEJ) approach to maximise the assimilative capacity of a marine area and minimise the environmental degradation due to new activities **(4)**. The research showed BEJ as central to cost-effective marine adaptive management, especially in data-poor areas.

ii) Evaluation of GES assessment tools: Mazik jointly conceived and coordinated research on the collation and interrogation of European marine biodiversity indicators **(5)** and monitoring programmes, leading to the development of a framework to enable the transparent and standardised evaluation and selection of indicators for MSFD implementation **(5)**. This was linked to the development of DEVOTool (a software tool to select appropriate indicators for the MSFD, providing an integrated and comparative means of biodiversity assessment) which in turn underpinned the development of NEAT (the Nested Environmental Status Assessment Tool). The research highlighted that standardized approaches such as this are necessary to ensure coherence of MSFD implementation and knowledge-sharing between Member States.

3. References to the research (indicative maximum of six references)

1. Borja, A., **Elliott, M.**, Andersen, J.H., Cardoso, A.C., Carstensen, J., Ferreira, J.G., Heiskanen, A-S., Marques, J.C., Neto, J., Teixeira, H., Uusitalo, L., Uyarra, M.C., Zampoukas, N. 2013. Good Environmental Status of marine ecosystems: What is it and how do we know when we have attained it? *Marine Pollution Bulletin* 76, 16-27. <http://dx.doi.org/10.1016/j.marpolbul.2013.08.042>
2. Saul, R., Barnes, R., **Elliott, M.** 2016. Is climate change an unforeseen, irresistible and external factor – a force majeure in marine environmental law? *Marine Pollution Bulletin* 113 (1-2), 25-35. <https://doi.org/10.1016/j.marpolbul.2016.06.074>
3. Patricio, J., Texeira, H., Borja, A., **Elliott, M.**, Berg, T., Papadopoulou, N., Smith, C., Tiziana Luisetti (Cefas), Uusitalo, L., Wilson, C., **Mazik, K.**, Niquil, N., Cochrane, S., Andersen, J.H., **Boyes, S.**, **Burdon, D.**, Carugati, L., Danovaro, R., Hoepffner, N. 2014. DEVOTES recommendations for the implementation of the Marine Strategy Framework Directive. DEVOTES Deliverable D 1.5 (http://www.devotes-project.eu/wp-content/uploads/2014/10/DEVOTES_Deliverable-1-5.pdf)
4. **Elliott, M.**, **Boyes, S.J.**, Barnard, S., Borja, A. 2018. Using best expert judgement to harmonise marine environmental status assessment and maritime spatial planning. *Marine Pollution Bulletin* 133, 367-377. <https://doi.org/10.1016/j.marpolbul.2018.05.029>

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5. Queiros, A.M., Strong, J.A., Mazik, K., Carstensen, J., Bruun, J., Somerfield, P., Bruhn, A., Ciavatta, S., Chuševè, R., Nygård, H., Flo, E., Bizsel, N., Ozaydinli, M., Muxika, I., Papadopoulou, N., Pantazi, M. & Krause-Jensen, D. 2016. An objective framework to test the quality of candidate indicators of good environmental status. *Front. Mar. Sci.* 3:73 <https://doi.org/10.3389/fmars.2016.00073>

Grant: EU FP7 programme 'DEVOTES project' (DEVELOPMENT OF innovative TOOLS for understanding marine biodiversity and assessing Good Environmental Status) 2012-2016. UoH PI: Prof. Mike Elliott. £281,628.8 awarded to UoH.

Awards: DEVOTES was runner up in the Frontiers (Open Access Journals) Spotlight Award (2017) for the scientific impact of the project (<https://blog.frontiersin.org/2017/05/08/ocean-sustainability-plastic-policy-supported-by-science-to-protect-our-oceans/>). It also received the COLUMBUS Blue Society Knowledge Transfer Award (2018) for impactful research and knowledge exchange, recognising its contribution to the impactful application of knowledge by end-users implementing policy. The award specifically acknowledged the 'user-friendly tool' (NEAT) developed in the project (<http://www.columbusproject.eu/columbus-news/news/1852-bs-awards>).

4. Details of the impact (indicative maximum 750 words)

Research by UoH generated two major forms of impact:

1. Highlighting inadequacies in the MSFD which, together with simultaneous reports by others across Europe, led to a technical review of the Directive. This review in turn led to a major policy update which acted upon recommendations made by UoH and collaborators. This represented a key change to the strategy for MSFD implementation in all European Seas.
2. Evaluation and testing of indicators of GES led to the development of the NEAT tool (based on DEVOTool) which has provided a validated tool for the integrated, consistent and comparative assessment of biodiversity status and GES across European regional seas. This has also been taken up for use in the HELCOM (Helsinki Commission) region (the Baltic).

Impact 1. Change to EU policy

Elliott's research (1, 2) and co-authorship of 3 with Mazik, Boyes and Burdon, together with documents produced by other Institutions, Member States and EU Departments, unanimously concluded the requirement for review and clarification of the Commission Decision 2010/477/EU. The review was a three-Phase process; UoH research contributed significantly to Phase 1 through leadership of the Work Package (Elliott and Mazik) under which the research was carried out, joint coordination and authorship of the research, and joint coordination of a workshop during which the final recommendations were agreed (A, B):

Phase 1 (end 2013 – mid 2015): technical and scientific review

Experts from the respective MSFD CIS (MSFD Common Implementation Strategy) or RSC (Regional Seas Conventions) groups under the coordination of the JRC (European Commission Joint Research Centre) and ICES (International Council for the Exploration of the Sea) prepared technical and scientific reviews for each of the 11 descriptors of GES. These formed the basis of a series of descriptor-specific workshops, led by the JRC, which led to recommendations for revision of the Commission Decision 2010/477/EU. UoH research (1, 3) and research later published as 2 and 4 was submitted (at the request of the EC, as confirmed by B) to feed into this process, and is cited throughout JRC workshop reports C and D. These reports clearly acknowledge the recommendations made by UoH work (e.g. "recent scientific literature and R&D projects have provided a huge amount of guidance on this topic (e.g. Patricio et al., 2014)") (3), as cited in D. These recommendations agreed with those made by other organisations within the EU and individual Member States and were taken forward to Phase 2. The UoH's contribution is clearly evidenced in two testimonials:

The Policy Officer at the European Commission's Directorate-General for Environment (DG ENV) confirms (A) that, for Phase 1 of the process, "Ongoing research projects, including the FP7

DEVOTES project in which the University of Hull was a partner, were a valuable source of information used in the advice. DEVOTES was particularly useful in that it was specifically focused on MSFD implementation and produced a considerable volume of relevant scientific studies in support of MSFD implementation, including...Patricio et al., 2014 [(3)]...This study represents an example of the importance of sound scientific research which is dedicated to support implementation of EU marine policy, and of the continued interaction between the research and policy implementation communities.” (A)

A testimonial from the Policy Officer at the European Commission’s Directorate-General for Research and Innovation (DG RTD), in the Unit where the DEVOTES FP7 project was managed (B) confirms *“the University of Hull’s significant contribution to informing the technical review of Commission Decision 2010/477/EU (undertaken between 2013 and 2015) regarding the Marine Strategy Framework Directive (MSFD)... as indicated by extensive citations to the work in ICES and JRC (European Commission Joint Research Centre) workshop reports that formed the outputs of this first phase... The workshop reports drew directly on the findings of the DEVOTES project, specifically recommendations from the research undertaken by the University of Hull’s Mike Elliott and his colleagues.” (B)*

Furthermore, DEVOTool and NEAT and the underpinning indicator catalogue (see Impact 2 above) fed into the 2015 ICES technical review of the Commission Decision 2010/477/EU in relation to seafloor integrity (Descriptor 6) (E).

Phase 2 (mid 2015 - end 2015): consultation and discussion

The MSCG (Marine Strategy Coordination Group, chaired by the EC Directorate-General for Environment) coordinated a formal consultation of the results of the technical review, allowing the MSFD Common Implementation Strategy (CIS) to provide a consolidated opinion.

Phase 3 (end 2015 – mid 2016): decision-making

During this phase, the European Commission took on board the outcome of phase 1 and 2 and made a final decision on the clarifications required to address the inadequacies of the MSFD. On 17th May 2017, as a direct result of this technical review to which UoH outputs contributed (A, B), the European Commission adopted **Commission Decision 2017/848/EU (F)**, which repeals the Decision 2010/477/EU and redefines the criteria and methodological standards on GES, and the specifications and standardised methods for marine monitoring and assessment. This represented a major change to the strategy for MSFD implementation in all EU Member States and other European seas (F). The recommendations made by the UoH research are carried through into the new policy document (A, B).

Testimony from the Joint Head of the Marine Ecosystems Team at the UK’s Joint Nature Conservation Committee (JNCC) (G) confirms the adoption of the new Commission Decision 2017/848/EU *“as beneficial in terms of our ability to deliver under MSFD, and acknowledges that the revised Commission Decision constitutes an important guidance to support the UK Marine Strategy and assessments under OSPAR (representing the North East Atlantic region)”*. (G)

Impact 2. Provision of tools for delivering GES

Mazik played a key role in the collation, evaluation and testing of indicators for assessment of GES. This led to the development of the DEVOTool catalogue and software which facilitates selection of appropriate indicators for assessing GES under the MSFD. DEVOTool underpinned and was directly incorporated into the Nested Environmental status Assessment Tool (NEAT) (H) which has now been further developed and implemented across the Helsinki Commission (HELCOM) region (the Baltic) (I).

Beneficiaries

Direct beneficiaries include the EU, and thus its 22 maritime Member States; other states and overseas territories adopting EU practices; the UK Government, Devolved Administrations and their relevant executive bodies (e.g. Defra, Marine Scotland, DAERA (Dept. of Agriculture, Environment and Rural Affairs, NI), Natural Resources Wales); and the Regional Seas

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Conventions - OSPAR (NE Atlantic), HELCOM (Baltic), Barcelona Convention (Mediterranean), and Black Sea Commission (under the Bucharest Convention).

Dates of impact

1. Review of EU Directive and policy update: 18th May, 2017- present. Ongoing until next policy revision (F).
2. Development of NEAT: February 2016 – present. Ongoing (H, I).

5. Sources to corroborate the impact (indicative maximum of 10 references)

All available as pdfs on request.

A. Letter of support from Marine Environment Policy Officer at the European Commission's Directorate-General for Research and Innovation (DG RTD)), explaining the role of UoH in the review and repeal of Commission Decision 2010/477/EU.

B. Letter of support from Policy Officer at the European Commission's Directorate-General for Research and Innovation (DG RTD), (formerly at Joint Research Centre, Ispra, Italy) explaining the role of UoH in the review and repeal of Commission Decision 2010/477/EU.

C. Palialexis, A. (ed.) 2015. Review of the Commission Decision 2010/477/EU concerning MSFD criteria for assessing Good Environmental Status.

<https://mcc.jrc.ec.europa.eu/documents/201604040717.pdf>

D. Palialexis A. & Cardoso, A.C. (eds), Report of the JRC's Descriptor 1 workshop to support the review of the Commission Decision 2010/477/EU concerning MSFD criteria for assessing Good Environmental Status; EUR 27715.

<https://mcc.jrc.ec.europa.eu/documents/201604040555.pdf>

E. ICES. 2015. Report of the workshop on guidance for the review of MSFD decision descriptor 6 – seafloor integrity II (WKGMSFDD6-II), 16-19 February 2015, ICES Head-quarters, Denmark. ICES CM 2015\ACOM:50.

<https://archimer.ifremer.fr/doc/00276/38704/37213.pdf>

F. European Commission - Environment. Our Oceans, Seas and Coasts. Legislation: The Marine Strategy Framework Directive. https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm and <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017D0848&from=EN>

G. Letter of support from Joint Head of Marine Ecosystems Team, Joint Nature Conservation Committee, explaining the impact of the policy change on MSFD implementation in the UK.

H. Berg, T., Murray, C., Carstensen, J., Andersen, J.H. 2016. NEAT – Nested Environmental status Assessment Tool v1.3.

<http://devotes-project.eu/wp-content/uploads/2017/06/NEAT-manual-v1.3.pdf>, providing details of the incorporation of DEVOTool into NEAT (see pages 4, 7, 17, 31, 37).

I. Outcome of the HELCOM BalticBOOST workshop on the HOLAS II biodiversity assessment tool.

<https://portal.helcom.fi/meetings/HELCOM%20BalticBOOST%20Biodiv%20WS%201-2016-324/MeetingDocuments/Outcome%20of%20HELCOM%20BalticBOOST%20Biodiv%20WS%201-2016.pdf>.