

Institution: University of Liverpool		
Unit of Assessment: Geography and Environmental Studies (UoA 14)		
Title: New Policy-focused Practices in Marine Ecosystem-Based Management		
Period when the underpinning research was undertaken: 2007-2020		
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:
Sue Kidd	Senior Lecturer	1991-2020
Leonie Robinson	Senior Lecturer	2006-present
Stephen Jay	Senior Lecturer	2011-present
Period when the claimed impact occurred: 2013-2020		
Is this case study continued from a case study submitted in 2014? No		
1 Summary of the impact		
<p>The University of Liverpool's (UoL) <i>Marine Management Group</i> develops ecosystem-based measures to safeguard the world's seas and oceans and enable sustainable maritime development. Our research has led to change in policy and practice by (1) mobilising stakeholders for the governance of the Irish Sea, and (2) developing tools for implementing national marine legislation. Specifically (1): enabled the creation of 10 Marine Conservation Zones in English waters, protecting vulnerable species; and established the Irish Sea Maritime Forum which works for the integrated governance of the Irish Sea. (2): Dutch and Irish agencies and the intergovernmental body for the Northeast Atlantic are using our approach to prioritise management needed under the Marine Strategy Framework Directive, leading to improved environmental status of national waters; and South Africa is following our procedure for marine spatial planning in the Eastern Cape marine area.</p>		
2 Underpinning research		
<p>The world's seas and oceans are under pressure from climate change, pollution and growing human demands. Our research aims to improve human interaction with the sea, bringing the social and natural sciences into direct engagement with government and wider society.</p> <p>Our research began with the interdisciplinary ESRC/NERC seminar series <i>New Approaches to Managing Ecosystem Services in the Marine Environment (NAMESME)</i>, coordinated by Kidd (09/2007-08/2010). This involved 5 seminars bringing together UK academics from the natural and social sciences, along with marine planning and management stakeholders. Discussion in these seminars drew out novel connections between marine planning and 100 years of terrestrial spatial planning experience (3.1).</p> <p>Kidd led a follow-on ESRC Knowledge Exchange award <i>Partnership Working in Support of Marine Spatial Planning in the Irish Sea (MSPIrishSea)</i> (09/2010-08/2011). This dealt with the complex regional arrangements for new systems of marine planning, covering 6 national jurisdictions with separate agencies and marine stakeholders. Kidd subsequently led UoL input to the European Commission (EC) (LIFE) project <i>Celtic Seas Partnership (CSP)</i> (01/2013-04/2017) which developed transboundary cooperation for implementation of the Marine Strategy Framework Directive. Kidd also developed thinking in stakeholder engagement in marine management through academic publications (e.g. 3.2), stressing the need for equitable and representative participation.</p> <p>Robinson led the EC projects (FP7) <i>Options for Delivering Ecosystem-based Marine Management (ODEMM)</i> (03/2010-12/2013) and (Horizon 2020) <i>Knowledge, Assessment and Management for Aquatic Biodiversity and Ecosystem Services (AQUACROSS)</i> (06/2015-11/2018). A tool was developed to measure human pressures on regional seas, taking into account ecological risk and potential for recovery (3.3). This enables users to evaluate their management options for reducing environment impacts and see the potential for achieving their obligations under the EU's Marine Strategy Framework Directive, over policy time frames (3.4).</p> <p>Jay and Kidd led three EC projects <i>Transboundary Planning in the European Atlantic (TPEA)</i> (12/2012-02/2015) <i>Supporting Implementation of the Maritime Spatial Planning Directive in the Celtic Seas (SIMCelt)</i> (12/2016-02/2018), and <i>Supporting Implementation in the Atlantic</i></p>		

(SIMAtI) (07/2019–06/2021). These stressed that ecosystem-based marine management and planning require not just technical solutions, but also integration with legislative and policy frameworks and the close involvement of stakeholder communities (3.5). These projects led to recommendations for linking marine spatial planning (MSP) to wider political structures and priorities (3.6).

3 References to the research

3.1 Kidd, S., Plater, A. & Frid, C (eds) (2011) The Ecosystem Approach to Marine Planning and Management, Earthscan, London. ISBN 9781849711821

3.2 Kidd, S. & McGowan, L. (2013) Constructing a ladder of transnational partnership working in support of marine spatial planning: thoughts from the Irish Sea, *Journal of Environmental Management*, 126, 63-71. <https://doi.org/10.1016/j.jenvman.2013.03.025>

3.3 Knights, A. M., Piet, G. J., Jongbloed, R.H. ... & **Robinson, L. A. 2015. An exposure-effect approach for evaluating ecosystem-wide risk from human activities, *ICES Journal of Marine Science*, 72(3), 1105-1115. <https://doi.org/10.1093/icesjms/fsu245>**

3.4 Piet, G.J., Jongbloed, R. H., Knights, A. M. & **Robinson, L.A. (2015) Evaluation of ecosystem-based marine management strategies based on risk assessment, *Biological Conservation*, 186, 158-166. <https://doi.org/10.1016/j.biocon.2015.03.011>**

3.5 Jay, S., Alves, F., O'Mahony, C. et al (2016) Transboundary Dimensions of Marine Spatial Planning: Fostering Inter-jurisdictional Relations and Governance, *Marine Policy*, 65, 85-96. <https://doi.org/10.1016/j.marpol.2015.12.025>

3.6 Jay, S. (2018) The shifting sea: lively space, immersed planning, *Environmental Policy and Planning*, 20(4), 450-467. <https://doi.org/10.1080/1523908X.2018.1437716>

Grant details (see section 2)

- **NAMESME**: University of Liverpool; NERC/ESRC grant, 09/2007-08/2010; £20,000.
- **MSP Irish Sea**: University of Liverpool; ESRC grant ES/H044485/1; 09/2010-08/2011 (12 months); £9,076.
- **CSP**: WWF-UK (coordinator) plus 4 partners; European Commission LIFE grant LIFE11 ENV/UK/000392; 01/2013-04/2017 (51 months); €1,973,546.
- **ODEMM**: University of Liverpool (coordinator) plus 16 partners; European Commission FP7 grant 244273; 03/2010-12/2013 (45 months); €8,271,981.
- **AQUACROSS**: Ecologic Institute (coordinator) plus 15 partners; European Commission H20:20 project 642317; 06/2015-11/2018 (42 months); €6,913,117.00.
- **TPEA**: University of Liverpool (coordinator) plus 8 partners; European Maritime & Fisheries Fund grant S12.636626; 12/2012-02/2015 (27 months); €1,000,000.
- **SIMCelt**: University College Cork (coordinator) plus 6 partners; European Maritime & Fisheries Fund grant 2014/1.2.1.5/SI2.719473; 12/2016-02/2018 (27 months); €1,811,520.
- **SIMAtI**: University College Cork (coordinator) plus 10 partners; European Maritime & Fisheries Fund grant 2018/1.2.1.5/SI2.806423; 07/2019–06/2021 (24 months); €1,800,000.

4 Details of the impact

Coastal nations around the world face the challenge of historic misuse of their seas and the consequences of climate change on the oceans. We have worked directly with government agencies and stakeholders to develop practices to manage marine resources in a more sustainable way. These practices have been internalised by organisations which are now carrying them forward in the implementation of national and international policy. This is producing material outcomes in four marine areas: the Irish Sea, the North Sea, the Northeast Atlantic and South Africa's seas. We have changed the way that agencies and stakeholders act, specifically under two themes.

4.1 Mobilisation of Stakeholders in the Governance of the Irish Sea

Good marine ecosystem-based management needs effective communication between government and stakeholders, ensuring knowledge transfer and better implementation of policy. We have brought stakeholders into the heart of governance of the Irish Sea in two areas of work.

4.1.a Stakeholder-informed Marine Conservation Zones

A programme for designating Marine Conservation Zones (MCZs) in English waters began in 03/2010 to protect habitats and species that are important, rare or under threat (under Marine and Coastal Access Act 2009). Regional stakeholder groups were tasked with proposing MCZs.

Kidd was brought in as independent chair of the Irish Sea Conservation Zones board (03/2010-04/2012), leveraging her knowledge from project work (**NAMEME** and **MSPIrishSea**) and expertise in stakeholder-led approaches (3.1). As noted by a water management company Director (5.1.a), “Without Sue’s oversight... the Project would have suffered delays in delivery and a lower overall quality of recommendations”. Stakeholders (such as offshore renewables, fishing, shipping, recreation and conservation) were “reminded of their obligation to work together, focusing on their common vision rather than their own individual interests”.

These pre-2014 activities provided the essential capacity for subsequent impact. Crucially, the board recommended 15 MCZs, of which 10, covering 1,309km², were finally designated in 2019 (5.2.a, 5.2.b), and for which management measures are now being put in place. For example, the Cumbria Coast MCZ stretches along 27km, protecting 8 key features, including honeycomb worm reefs and rocky habitats; it includes England’s only breeding colony of black guillemots which are now protected from fishing nets during the nesting season thanks to a voluntary netting ban brought in as an MCZ measure (5.2.c).

4.1.b Irish Sea Maritime Forum

As a result of **MSPIrishSea** (3.2), Kidd led the formation of the Irish Sea Maritime Forum (ISMF) in 06/2012 (5.3.a). This is a partnership of government agencies, industry, and environmental stakeholders from across all six Irish Sea jurisdictions. A Science Advisor of Historic England testifies (5.3.d), “The Irish Sea Maritime Forum exists due to Sue’s initiative, vision, and leadership skills. Its successes are largely due to her ability to encourage stakeholders to work together”. The Manger of the NW Coastal Forum states (5.3.c), “One of the key ... benefits of the Forum includes building stronger networks between Irish Sea users.” Its importance is reflected in high-level political support; its current chair is a former Irish Senator (5.3.e). This has provided the platform for subsequent impact.

A 2018 stakeholder review demonstrated that ISMF provides the institutional structure needed to facilitate cooperative management of the Irish sea’s resources: “The Irish Sea is a natural unit... There is a clear need for transboundary cooperation which is met by the ISMF” (5.4.a).

Activities between 01/2014 and 02/2020, including well-attended conferences and stakeholder events (5.3.b), have benefitted members as revealed through a survey, for example (5.4.c):

- “Keeping up to date with all new development” (Northern Ireland Government)
- “Continued cooperation and understanding of issues/opportunities” (UK Agency)
- “Build capacity to respond to transnational issues” (Fisheries industry)
- “Having a wide range of stakeholders allows for better outcomes” (Planning Authority)

A former Liverpool Councillor states “decision makers, including myself, had our views changed and now, wind energy in the Irish Sea is a significant and growing economic and environmental benefit” (5.4.e).

In addition to these governance changes, impacts include: securing funding worth over €8 million for projects supporting EU Directives for environmental quality and marine planning; *Blue Growth Prospectus for the Irish Sea Region* 2015 setting out opportunities for shipping, blue energy, fisheries, blue biotechnology and tourism (5.4.b); and the Ireland-Wales Interreg project *Ecostructure* that developed concepts for multi-functional natural and hard sea defences (5.4.d).

4.2 **Application of Tools for Implementing National and Regional Marine Legislation**

Marine ecosystem-based management needs practical approaches that can be used to implement policy and legislation effectively. We have developed tools to enable national

agencies to manage their marine resources in the context of two legislative frameworks: the EU's Marine Strategy Framework Directive and South Africa's Marine Spatial Planning Act.

4.2.a Marine Management Strategies in the Netherlands, Ireland and beyond

The EU's 2008 *Marine Strategy Framework Directive* (MSFD) aims to address the deteriorating environmental conditions of European seas, requiring coastal Member States to achieve Good Environmental Status (GES) of their marine waters by 2020. However, there was no clear approach for reaching this target. Robinson led the **ODEMM** project that produced a *pressure assessment tool* (3.3, 3.4) which enables decision makers to identify the key human pressures acting on their marine ecosystems and to select the best measures for achieving GES (5.5.a.).

Government agencies have now applied this tool to advise governments in Ireland and the Netherlands. It was adopted in 2014 in Ireland to assess the threats to marine environmental status. This was the "first application of the ODEMM framework... completed for Ireland's marine waters" (5.6.b). The findings were used to advise the Irish government on the selection of management measures which since 2018 have now been used to achieve recovery of Irish marine ecosystems. A Principal Investigator for Ireland's Marine Institute confirms, "We have carried this out using the assessment approach ...developed by Dr Robinson" (5.6.a).

In the Netherlands, the tool has been adapted to underpin selection of management measures in 2018-20 which are now being used to achieve the GES objectives across Dutch marine waters and the broader North Sea. The Dutch principal Investigator on marine ecosystem-based management states, "The risk-based pressure assessment approach developed by Dr Robinson's team is a really significant contribution to the field because it allows managers the ability to weigh up different options for sustainable use of marine ecosystems. Without this, single-sector based approaches miss the significant effects of multiple pressures acting on marine species and habitats" (5.6.c).

The tool has also been used by the International Council for the Exploration of the Sea (ICES), an intergovernmental marine science organisation for the Northeast Atlantic (5.7a). The ODEMM tool is now a key part of the technical guidance for the ICES Ecosystem Overviews (5.7b), the first set of which were published in 2019-20 and have affected decisions on ecosystem-based management across the region over this time-frame. The ICES Chair testifies, "Leonie's work in the field of ecosystem-based marine management has made a very significant contribution to the field both in Europe and across the broader Atlantic region" (5.6a).

4.2.b Marine Spatial Planning in South Africa

Marine spatial planning (MSP) has been introduced by many coastal nations to provide an integrated approach to regulated marine industries; it is now central to marine policy and practice in Europe. MSP was identified as a national priority in 2014 in South Africa, to help manage its extensive and internationally significant marine waters straddling the Atlantic and Indian Oceans, with great ecological diversity and social and economic importance.

Following his leadership of **MSP projects** and his international reputation (3.5, 3.6), Jay was invited onto South Africa's National Working Group tasked with producing the *National Framework for Marine Spatial Planning*, 09/2015-03/2016. He was the sole academic in the group, working alongside representatives of government departments. Jay led on the practical section of the Framework, setting out the steps and timeline to be followed by the government department now responsible for MSP in South Africa. He encouraged the adaptation of MSP to the South African context, such as MSP being a tool for redressing historic racial injustices.

The Framework was approved by the Minister of Environmental Affairs in 05/2017 (5.8.b). It is cross-referenced in South Africa's *Marine Spatial Planning Act* 05/2018 (5.8.c). Jay's involvement was coordinated by the German agency for international cooperation who provided logistical support to the process, and described him as having a "significant role" and "an important role in developing the procedural aspects of the Framework" (5.8.a).

The initial stages of the Framework are now being carried out (5.8.d). Firstly, a data portal has been developed that gathers, and makes publicly available, digital data on a wide range of marine characteristics and human activities, providing the evidence base for the marine plans (5.9.a). Secondly, four bioregional Marine Planning Areas have been designated. Work is now beginning on the first of these, the Eastern Cape region. Jay continues to support this process. A Director at the Dept of Environment, Forestry & Fisheries confirms that Jay is “currently facilitating international exchange... between government agencies responsible for marine spatial planning in the Global South” (5.9.b).

5. Sources to corroborate the impact

5.1 Marine Conservation Zones Process

- a. Letter from Director, Wood Group UK, confirming Kidd’s role on the MCZ board

5.2 Marine Conservation Zones Outcomes

- a. Joint Nature Conservation Committee map showing distribution of MCZs now established in the Irish Sea <https://jncc.gov.uk/mpa-mapper>
- b. Official information on MCZs <https://www.gov.uk/government/collections/marine-conservation-zone-designations-in-england> describing measures now in place
- c. Cumbria Coast MCZ Fact Sheet describing protective measures now in place https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915627/mcz-cumbria-2019.pdf

5.3 Establishment of the Irish Sea Maritime Forum

- a. History of ISMF <http://www.irishseamaritimeforum.org/about/ismf-history/>
- b. List of Organisations Attending ISMF Events, showing breadth of engagement
- c. Letter from Manager of NW Coastal Forum, confirming Kidd’s leadership of ISMF
- d. Letter from Science Advisor, Historic England, confirming Kidd’s key leadership roles
- e. Letter from former Irish Senator, Chair of ISMF, confirming Kidd’s key role in ISMF

5.4 Outcomes of the Irish Sea Maritime Forum

- a. ISMF Key Stakeholder Review 2018, demonstrating the benefits of ISMF
- b. Blue Growth Prospectus for the Irish Sea Region 2015, showing ISMF leadership
- c. Extract of Stakeholder Survey 2020, testifying to ranging outcomes benefits of ISMF
- d. Ecostructure project website <https://www.ecostructureproject.eu>
- e. Letter from former Liverpool Councillor, confirming the significant outcomes of ISMF

5.5 Development of ODEMM tool

- a. ODEMM Resources <https://www.odemm.com/content/pressure-assessment>

5.6 Application of ODEMM tool by national agencies

- a. Letter from Principal Investigator, Ecosystem Based Fisheries Management, Marine Institute Ireland, confirming Robinson’s key contribution to environmental assessments
- b. Pedreschi et al 2019, Integrated ecosystem analysis in Irish waters, confirming the application of the ODEMM tool by Ireland: <https://doi.org/10.1016/j.fishres.2018.09.023>
- c. Letter from Dutch lead on Ecosystem-based Marine Management at Wageningen University confirming the use of the tools developed by Robinson to fulfil EU obligations

5.7 Application of ODEMM tool in ICES Ecosystem Overviews

- a. ICES Ecosystem Overviews for all eco-regions <https://www.ices.dk/advice/ESD/Pages/Ecosystem-overviews.aspx>
- b. ICES Technical Guidelines, Ecosystem Overviews 2018 http://www.ices.dk/sites/pub/Publication%20Reports/Guidelines%20and%20Policies/16.2_Ecosystem_overviews_guidelines_2018.pdf

5.8 Development of the South African Marine Spatial Planning (MSP) Process

- a. Letter from German agency confirming Jay’s role in the National Working Group
- b. National MSP Framework 2017, including Jay’s direct contribution (pp20-30)
- c. Marine Spatial Planning Act 2018, referencing the National Framework (clause 9)
- d. Approach to S Africa’s Marine Planning Areas 2019, implementing the Framework

5.9 Outcomes of South African Marine Spatial Planning Process

- a. MSP Support Viewer for South Africa, providing support for the Framework <https://ocims-dev.dhcp.meraka.csir.co.za/marine-spatial-planning-support>
- b. Letter from Chief Director at Dept of Environment, Forestry & Fisheries confirming Jay’s continuing support of South Africa’s MSP process