



Marine social sciences: Looking towards a sustainable future

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ARTICLE INFO

Keywords:

Marine and coastal management
Marine social science
Marine policy
Research priorities

ABSTRACT

Marine and coastal environments provide extensive and essential ecosystem services upon which much of humanity relies, yet the incorporation of human dimensions into marine and coastal policy and management has historically been lacking. As efforts to address the substantial and diverse challenges facing marine and coastal environments continue, recent years have seen a growing call for greater consideration of people, how they interact with the marine environment, and the resultant implications for developing effective policy and management. Indeed, in recent times recognition of the importance of marine social science research, data, evidence and expertise has undergone an upward trajectory. Despite this growing level of awareness of the value of social science to the wider marine and coastal management agenda, effective and meaningful inclusion of marine social science into research and practice has remained a challenge. Here we approach this global challenge as an opportunity to bring the community together to set a forward-looking international research agenda, recognising the role of multiple approaches and diverse methods understanding the relationship between society and the sea, galvanising the research and practice community across marine social sciences and beyond. Furthermore, by bringing together this increasingly active community, we can identify mechanisms of change and pathways to enable inclusion of marine social sciences within global ocean policy. This paper draws on the views of researchers and practitioners from across the marine social science disciplines, brought together through an expert workshop held at the MARE 2019 conference (June 2019) and representing a range of geographical regions and perspectives. Through the workshop, delegates identified a number of priorities for the ongoing development of the marine social science community, including the need to improve capacity for marine social science research globally, the importance of nurturing an inclusive and equitable marine social science research community and the role of networks to continue to raise the profile of marine social science data and evidence for global ocean policy and management. Additionally, the discussions provided valuable insight into existing knowledge gaps and potential research priorities for the future. Finally, the paper presents a future vision and recommendations for an international and interdisciplinary marine social science agenda, calling for collaborative and strategic thinking on marine social sciences from across the marine science and policy interface. Critically, we show how social science needs to be embedded in all aspects of marine and coastal management in order to create truly sustainable solutions to the pervasive environmental challenges we face.

1. Introduction

Despite its vastness and seeming never-ending capacity to withstand the pressures placed on it by human society, it has been recognised for some time that the global ocean is not limitless. Worldwide, marine and coastal ecosystems are experiencing unprecedented levels of anthropogenic pressure (Halpern et al., 2008). The situation is global, with increasing evidence that humanity's effect on marine wildlife is substantial, impacting functioning and provision services in every ocean.

This degradation of marine and coastal ecosystems has profound implications for societal use of the sea, and its ongoing management. A move to take better account of human dimensions within marine decision making is increasingly observed across different scales of governance, including international agendas (e.g. [UN General Assembly, 2015](#)); national policies (e.g. the UK Government's 25 Year Environment Plan 2018); efforts across the globe to develop national and regional marine plans (Ehler, 2018) and a plethora of affiliated areas of legislation which speak to the human dimension of natural resource

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<https://doi.org/10.1016/j.envsci.2020.03.015>

Received 30 October 2019; Received in revised form 18 March 2020; Accepted 18 March 2020

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management (e.g. Welsh Government, 2016).

Traditionally, discussions around marine and coastal management have positioned ‘people’ as the key driver of negative impacts for the global seas, with anthropogenic activities more broadly, cited as one of the most pressing challenges facing our seas (MA, 2005; Pascual et al., 2017). More recently, the conversation around marine and coastal management has started to shift, and there is a growing recognition of the role of individuals and communities as part of the solution (Jefferson et al., 2015). This draws on the concept of environmental citizenship and/ or stewardship, a concept that is not new, and yet is continually evolving (Bennett et al., 2018; Hawthorne and Alabaster, 1999), with recent forays into this field of research focusing on marine and coastal contexts (Steel et al., 2005 and Guest et al., 2015 focusing on ocean literacy; McKinley and Fletcher, 2010, 2012; Fletcher et al., 2012 examining the potential role and application for the concept of marine citizenship).

For society to be part of solutions there is a need to better understand the multifaceted and evolving relations between people and the sea. Consideration of the human dimensions of the sea – the health and wellbeing benefits of being by the coast, its inspirational qualities, childhood experiences and memories, cultural connection and its influence on sense of place and identity for coastal communities, for example – is a complex challenge. While the natural sciences have a critical role in understanding the physical nature of the ocean and associated impacts of people, social sciences offer a range of methods and approaches to investigate these human dimensions. Social science is a broad umbrella term that draws together a wide range of subjects and approaches including sociology, politics, economics, human geography among others. In addition to dealing with a range of subject materials social science also embraces diverse methods of enquiry ranging from quantitative through to qualitative methods and embracing arts based research in some cases (Leavy, 2015). Different social science disciplines have their own history of relating to ocean studies. For instance, (Hannigan, 2017) suggests that the ocean has long been ignored in sociology but is an emerging ecological hot spot and a medium for geopolitical rivalry and conflict and argues that a new ‘sociology of oceans’ is needed. Diverse researchers from history, psychology, anthropology, international relations to tourism have encountered the sea in their studies, while other scholars have long been advocating for improved inclusion of social sciences within wider marine sciences (see for example Jentoft et al., 1998; Scoones, 1999; Christie et al., 2003; Kaplan and McCay, 2004). This range of disciplinary approaches, captured through the broad idea of social science, provides multiple lenses through which the relationality between humans and the ocean can be understood, both in terms of practical methods and approaches through to explanatory conceptual framings.

Numerous authors have examined the myriad of value types, as well as the methods of assessment, which has led to a shift in our understanding of the complexity of peoples’ relationship with the sea. Potts et al. (2016) for example, presents a review of European attitudes towards the sea, examining how attitudes and values can vary, sometimes unexpectedly, across countries. Some authors have focused on of the human dimensions of management interventions (e.g. Voyer et al., 2015 or Yates et al., 2019 relating to MPAs, Börger et al., 2014 with reference to marine spatial planning), the perceptions of certain stakeholder groups (Pita et al., 2011; Yates, 2014 on fishers’ perceptions of management), the role of blue space in supporting individual and societal wellbeing (Kelly, 2018), or on the need to understand the role of, and improve, ocean literacy and marine citizenship (e.g. Steel et al., 2005; Guest et al., 2015; McKinley and Fletcher, 2012, 2010). Other authors have presented alternative framings for the discussion of the value of the sea (e.g. Chan et al., 2012a,b) and the need to take account of non-monetary values within modern marine governance (see for example, IPBES, 2017). Fundamentally, marine social sciences can help understand and shape relational values connecting people and the marine world in ways that can help deliver behaviour change (Martin

et al., 2017).

Many of the solutions put forward to address the challenges facing the marine environment, like plastic pollution, are underpinned by calls for significant societal and cultural behaviour changes at an individual and institutional level. For example, suggestions have included calls to improve connection with nature, a move away from economic growth being the measurement of success, and a change in working patterns (Stafford and Jones, 2019). Many marine and coastal management challenges are bound up in complex socio-ecological relationships that require a broad range of disciplinary perspectives to unravel. Not least because failure to connect ecological realities with the lived experience of diverse stakeholders, from the general public to the CEOs of international companies, runs the danger of apathy and lack of action, with connectedness to nature increasingly cited as having a crucial role in delivery of environmental management (MacKay and Schmitt, 2019; Restall and Conrad, 2015). Despite the clear importance of the social dimensions of marine and coastal management, the shift in focus to consider more social aspects, and an almost exponential growth in marine social sciences research, social science inclusion within global marine and coastal policy remains challenging. For example, the case study and often qualitative approaches commonly associated with social science research does not easily ‘fit’ with traditional approaches to policy making (Bennett, 2019). There is a need for increased emphasis and understanding of the value of diverse marine social sciences, with greater recognition of its role in delivering effective marine management (Bennett, 2019; Bavinck et al., 2018; Bennett et al., 2017; Longo and Clark, 2016; Gruby et al., 2016; Jefferson et al., 2015).

In the following paragraphs we explore the challenges and barriers facing the marine social science community. We identify ways of moving forward and better realising the utility of the marine social science community drawing on the views of expert stakeholders observed during a workshop organised at the MARE 2019 Biannual conference. The workshop brought together marine social science researchers and practitioners representing a range of geographies and disciplines specifically to develop a collaborative and forward-thinking research agenda. This paper presents and explores the results of those discussions and summarises the resultant research agenda, which positions marine social science as a crucial facet of the wider marine sciences and key to the delivery of effective marine governance and management.

2. Methods

In order to collect views from a diverse audience of marine social science researchers and practitioners, a 90-minute interactive workshop was held at the 10th MARE Biannual Conference (<http://www.marecentre.nl/>). Attended by over 50 MARE delegates, the workshop attendees represented a range of marine social science disciplines (economics, geography, tourism, anthropology, psychology, tourism to name a few), areas of research (including marine plastics, relational values, marine spatial planning, ocean literacy, well-being, and IUU fishing) and geographic locations (including the UK, the Netherlands, Sweden, Japan, Germany, Italy, Colombia, Republic of Ireland, India, and Australia). The workshop began with an introductory presentation providing background context and guidance for the workshop discussions, before using a range of interactive facilitation techniques to elicit delegates’ views.

Through facilitated discussion, the workshop delegates explored two key questions (See Table 1 for the session questions and the approach used) relating to the development of an international, interdisciplinary research agenda for the growing marine social science community of research and practice.

Results from the open discussion were collected through note taking by workshop facilitators. These notes were then transcribed, with the most common themes identified through a manual coding process conducted by the lead author following standard qualitative data

Table 1
Summary of workshop questions and activities.

	Discussion points and questions	Facilitation Activity
Task 1	What are the challenges and opportunities related to supporting an interdisciplinary, international marine social science community, and how can we ensure it is an inclusive, and interdisciplinary community?	Open facilitated discussion, led by the lead author of this paper, to encourage a discussion the challenges and barriers to developing an inclusive marine social science community.
Task 2	What are the priority research questions and actions for a forward thinking, global marine social science agenda?	Delegates were asked to write their thoughts on an individual post it; these were collected at the end of the session.

analysis techniques (Braun and Clarke, 2006), with similar topics and themes were grouped together to identify dominant themes within the discussion using an emergent thematic coding process. Workshop delegates were also asked to form small groups and identify and discuss future research priorities for the wider marine social science community. These were captured on post-its, with one idea per post-it, and were collected at the end of the workshop session. These were transcribed verbatim and underwent a similar manual coding process as outlined above to interrogate the data and identify common themes, which were drawn upon to develop the final list of priorities. Quotes taken from the discussion and the workshop notes are presented in italics to provide support evidence where appropriate.

3. Workshop results and discussion

Throughout the workshop, it was clear that participants felt that there has been a significant change in the conversation around the role of social sciences in delivering wider environmental management, conservation and policy goals. While there was some feeling that this shift has been slower for marine social sciences than in other areas of natural resource management, it was acknowledged that there have been changes in recent years. Analysis of data from discussions highlighted that there were diverse challenges and opportunities for the marine social science community in the near future, with 33 different topics and issues raised during the open discussions. In addition to the results from open discussions, over 60 individual responses were collected relating to priorities for the marine social science community.

The information collected during the workshop was collated, and using the coding process described above, organised into 5 thematic priorities, which are set out and discussed below (summarised in Table 2).

Table 2
Summary of thematic priorities.

Thematic priorities	Description of theme
What is meant by marine social sciences and what can it do for the global ocean?	Clear need for the marine social science research community to come together to promote the value of marine social science research, further cementing its role and identify within broader marine science and ocean governance. Need to address a persistent lack of understanding of social science approaches, as well as encouraging a move towards greater collaboration and multi-, inter- and transdisciplinarity.
How can marine social science capacity be improved?	The expertise and skills within the marine social sciences community should be protected, whilst also supporting improved collaboration across disciplines. Recognising that some within the community have transitioned to marine social sciences from other fields, there is a need for targeted and focused learning and teaching initiatives aimed at strengthening and building the marine social science community.
Creating an equitable and just marine social science community	Improving access to funding through explicit inclusion of social sciences within calls for proposals as standard. This will require cultural and institutional shifts, which may take some time. Recognition of the challenges associated with existing hierarchical structures inherent within funding calls, as well as those of 'parachute research'. Cross-country and career stage collaborations should be encouraged across the community.
Supporting a growing community of marine social science research	The marine social science community should remain critical, with space to build capacity and innovation, with projects designed to support the flexibility and reflexivity linked to social science research. Practical actions were also recommended including the development of a glossary of terminology, as well as provision of more networking and publication opportunities.
Setting a forward-looking interdisciplinary research agenda for an international marine social science community	Need for a 'stock-take' of marine social science research to identify existing knowledge gaps and potential research priorities for the future. Potential themes for a research agenda may include: public perceptions, knowledge and behaviour change; marine governance and management; blue growth; social justice and equity; health and well-being and coastal communities.

3.1. What is meant by marine social sciences and what can it do for the global ocean?

An overarching theme from this discussion was the need for the community to continue to work together to promote the value of marine social science, ensuring and further cementing its identity as a valuable and valid discipline in its own right. There was a feeling that although, in some instances, there has been an increase in recognition of the role and value of social sciences, this is by no means the norm. One participant commented that "*social sciences have always felt undervalued but this is slowly changing...*" – change is taking time, and challenges relating to collaboration with other sciences, misunderstanding and perceptions of marine social sciences (related to the rigour and robustness of methods, for example) and mechanism of influence within the science-policy interface.

Related to this, participants touched on the longstanding, persistent lack of understanding of social science methods and theories from other disciplines – this is a commonly raised issue, and something that may become increasingly challenging, particularly as we see a move towards increased interdisciplinarity approaches. Workshop participants suggested that working in the different technical 'languages' inherent to all scientific disciplines can pose a significant barrier, recognising that developing a common language should not "*dumb down*" the technicalities of social sciences (or any other discipline, for that matter). There is, therefore, a need to "*learn to talk the same language*", engage across disciplines early in project development, emphasising the importance of including social sciences from the start, "*not as an add on [to projects]*".

In recent years, there has been move towards greater collaboration across disciplines, with increasing efforts to embed multi-, inter- and transdisciplinary research practices as a way of addressing global

challenges (Victor, 2015; Ledford, 2015). This is evidenced by a growing trend for interdisciplinary research funds – seen, for example, in the programme of projects supported by Valuing Nature Network [<https://valuing-nature.net/research>] which is a UK cross research council funded programme encompassing natural and social sciences, as well as arts and humanities. In the context of marine social sciences, interdisciplinarity and collaboration can occur at different scales, each of which are important to recognise. In the first instance, the diversity of subjects included within marine social sciences means that interdisciplinarity can occur without looking outside the marine social science community (e.g. psychologists working with artists, economists working with social marketers and governance experts). Secondly, there is also an opportunity to consider interdisciplinarity outside the world of social sciences i.e. social science working with natural science on a common goal or project. Overall, workshop delegates were strongly in favour of interdisciplinary working and recognised the added value of learning from different disciplines and approaches.

The diversity of disciplines, approaches, methods and theories encompassed within the notion of marine social sciences was highlighted by workshop participants; it was stressed that for marine social sciences to reach its potential, it must be used effectively, and this requires recognition that marine social scientists and practitioners are not a homogenous group. Participants were concerned that *“those outside social sciences don't always understand the nuances in how different disciplines work...and that there is a risk that grouping everyone as social sciences could mask specific skillsets and value of each discipline”*. While coming together under one banner can be useful in terms of raising the profile of marine social sciences more broadly, it is crucial that the variety, depth and breadth of the disciplines and topics that underpin it are not lost. Furthermore, there were conversations about the need to ensure different approaches in marine social sciences are differentiated from each other, just as is seen in the myriad of natural science disciplines i.e. botany, animal physiology, pharmaceuticals, and that to recognise that, just because a researcher is a ‘marine social scientist’ does not immediately mean they will be an expert in every area of this broad discipline. The magnitude and variety of potential approaches, methods and theories within marine social sciences was mentioned by some as being a potential barrier to interdisciplinary working – there was a feeling that those less familiar with social sciences may not know the best approach, or indeed who to approach to discuss research. It was suggested that a glossary setting out and describing key marine social science techniques and terminology could be a useful tool to support interdisciplinarity – further suggestions were made regarding the development of a thematic directory of researchers, hosted by the Marine Social Science Network, which could be accessed by those interested in collaborating, or in learning more about specific social science techniques. Despite the challenges discussed, diversity within this discipline was also seen as something that should be nurtured, and indeed, as a strength of the discipline – one attendee summarised this, stating that *“we should not work in siloes...social sciences sit on a spectrum and...inform one another”*.

3.2. How can marine social science capacity be improved?

As the call for interdisciplinarity continues to become the norm within scientific research, and indeed the remit of many funding calls, there is a need to ensure that those working across the sciences have the skills, expertise and capacity to deliver high quality research. It is crucial that the expertise and discipline of marine social sciences is protected – and that a move towards interdisciplinarity, or indeed transdisciplinarity, does not result in a dilution of this expertise. Instead, there is a need for improved collaboration across these disciplines, with appropriate marine social science researchers and skills brought in at project development stage, rather than as an afterthought or as a way of addressing the need to evidence a project's ‘impact’.

Workshop delegates recognised that recent years have seen a

growing demand for marine social science input, as well as growing numbers of non-social scientists taking tentative steps into the discipline. In response to this, it was suggested by some delegates that the development of a “Social science for marine sciences” course would serve to improve understanding of the complexities of marine social sciences, whilst also raising capacity and ensuring delivery of high-quality research outputs. One delegate suggested that marine social scientists have a tendency to under sell themselves – and that more could be made of the seemingly inherent interdisciplinary nature of the wider marine social science community. While many researchers working in marine social sciences come from a traditional social science background, some have transitioned between disciplines i.e. trained in marine biology but have retrained or become self-taught in marine social science disciplines. Participants emphasised the potential of the existing marine social science community, stressing the *“importance of [the sciences] working together for better results”* and the potential role of natural scientists as ambassadors who can promote the value of working with marine social scientists and engaging them in projects at an early stage.

Finally, the need for targeted learning and teaching initiatives related to marine social sciences, and the role of interdisciplinary research in addressing global challenges, was discussed. Of particular interest was a need to better understand the challenges associated with the scale of social research, which is often conducted at a case study or local/ regional level. Delegates called for a greater understanding of how this variance in scale (e.g. micro, meso, macro) should be articulated and information as to what scale is most useful for policy makers. Overall, there was a feeling that social science content is limited in most marine science education programmes; however, it was recognised that some institutions offer summer courses or may include one core module in a degree programme. It was evident that marine social science content was not considered to be commonplace across higher education provision – while the workshop delegates represented a reasonably geographically diverse group, an assessment of degree programmes would be useful, particularly at a time when calls for improved ocean literacy are growing louder.

3.3. Creating an equitable and just marine social science community

Access to funding remains a challenge for research in any field, regardless of discipline. However, there was a feeling that obtaining funding is particularly challenging for marine social sciences. Moreover, it was thought that funding challenges was something that is often exacerbated by the commonly interdisciplinary nature of projects including elements of marine social science. There was a feeling from workshop delegates that there is a need for cultural change within funding organisations and regimes, and that even when *“interdisciplinary research is being sought, it can still lead to social sciences being as ‘bolt on’”* – suggesting that there is scope for more explicit inclusion of social dimensions in funding calls. One delegate stated that there has been some progress, in some places, in recent years resulting in changes in funding calls; however, they went on to stress that cultural shifts of this nature take time. The aspirations of the marine social science community were clearly articulated by the group, with one stating that as a community, marine social scientists are arguably in a better position to lead projects and have the knowledge and skills to frame them in the context of social challenges,

Partially linked to the previous point on balancing capacity building and the need to work with existing marine social science expertise, the challenge of perceived hierarchical structures inherent within some funding calls (e.g. Global Challenge Research Fund) and the associated issue of ‘parachute research’ i.e. researchers from high or middle income countries conducting research in less developed regions with little or no engagement with or benefit to the local community or host country (see Hind et al., 2015 for more information about this issue) was also raised by workshop participants. As a community it is crucial

Table 3
Summary of suggested research priorities for marine social sciences (in no particular order of priority).

Theme	Example of specific research questions and priorities (taken from workshop feedback)
Perceptions, knowledge and behaviour change (across a range of scales)	<p>“how do perceptions of marine issues vary between actors, agents and policy makers, and how does this influence discourse?”</p> <p>“what are the drivers of environmental behaviour change, and how do we capitalise on recent efforts (e.g. marine plastics) to engender greater change?”</p> <p>“Need for improved ocean literacy at a local, regional, national and global scale”</p> <p>“How can relational approaches be used to better understand the multiplicity of values associated with marine and coastal environments?”</p> <p>“How can social science approaches be used to respond (and understand) public waves of excitement and awareness (e.g. marine plastic)”</p>
Marine governance and management	<p>“Measuring the success of governance/ policy - what does this mean? How do we do it?”</p> <p>“What are the lessons from land-based privatisation for marine space?”</p> <p>“What are the barriers to change within marine governance at different scales?”</p>
Blue growth (including fisheries)	<p>“How does local marine recreation and tourism influence each other and how do we avoid tourism squeezing out local recreation spaces through colonisation of the coast and the community?”</p> <p>“How are priorities for blue agendas assessed/ measured and defined?”</p> <p>“What are the behavioural drivers of non-compliance (in fisheries) including social, behavioural, economic and psychological?”</p> <p>“how does the governance and management of large-scale fisheries interconnect with food security?”</p>
Social justice and equity	<p>“What are the implications of ocean grabbing in the high seas?”</p> <p>“Understanding the alternative between neoliberalisations and human rights in fishing practices”</p> <p>“A need to understand the equity issues associated with illegal fishing practices”</p>
Health and wellbeing	<p>“What is the impact of MPAs on health and wellbeing?”</p> <p>“How do the health and wellbeing benefits of blue space vary with different geographical, environmental, cultural, economic and social context?”</p>
Coastal Communities	<p>“how can we understand coastal community resilience in the face of disasters and climate change”</p> <p>“What impacts do coastal communities experience (social, economic, environmental) in response to marine management and decisions, and what strategies can be taken to increase sustainability of increasing industrialisation of marine and coastal spaces?”</p>

that the expertise and skills of resident researchers working in Low or Middle Income Countries is recognised and valued, and that they are not looked over in favour of researchers coming in from other countries. Instead, cross-country collaborations should be grounded in co-development and co-production, with capacity building provided if required so that future work can be carried out by skilled researchers in their home country. It was also suggested that comparisons between developed and less developed countries would be valuable, both in terms of applicability of research methods in different social, economic, cultural and geographical contexts.

3.4. Supporting a growing community of marine social science research

Throughout the workshop, a number of suggestions were made as to practical actions that could be taken to continue to grow the marine social science community. For instance, participants felt that the marine social science community must continue to be critical, and that there should be space to build capacity and for innovation, development and indeed movement away from existing approaches and methods, if and when appropriate. There was a call for efforts to be made to ensure that the theoretical integrity of social science disciplines must not be lost as a result of its increased popularity, and that the community should be actively critiquing research approaches, developing new theories, working on leading science and not placed in a too narrow box of “behaviour change” or “engagement”. There was an overarching call for interdisciplinary projects to ensure they draw on social science expertise, with one delegate suggesting more needs to be done to ‘integrate social theory and classical social science literature into natural science questions and discussions?’. Additionally, workshop delegates also felt as interdisciplinarity becomes increasingly mainstreamed within research, projects should be designed to allow opportunities for the reflexivity and critique inherent to many social science projects. As discussed above, it was suggested that developing a glossary of terminology and definitions would be of benefit, supporting an improved understanding of marine social science research and related theories, methods and approaches. In response to the call for ongoing criticality being embedded within the growing network, this directory could be a living

document which could evolve as the discipline continues to evolve.

In terms of raising the profile of the marine social science community, it was felt that the community could benefit from discipline specific events and publication opportunities. One delegate suggested that a priority for the future would be the development of a subject specific peer review journal, while another indicated that planning a travelling programme of events and conferences would provide a valuable networking and knowledge exchange opportunity. Central to this discussion was the recognition that some events *do* exist (namely the MARE biannual conference and the Greenwich Maritime Centre biannual Society and the Sea conference), but workshop attendees stressed the similar geographic location of these events (both in western Europe) and emphasised the need to create opportunities in other geographical locations. There was the suggestion that the planning a series of events that is hosted in different places on different occasions would be a valuable contribution to the growth of the community. Associated with this notion of growing the community, it was suggested that there is a role for science communication in raising the profile and improving the uptake of marine social science research.

Finally, relating to the notion of a ‘community’, workshop delegates also discussed the issue of gender equality and bias in marine sciences, and the challenges inherent within this. There were mixed views on this topic, with some delegates citing a recent report which positions marine sciences more broadly as employing a higher proportion than women than other STEM subjects. Despite a feeling that in marine social sciences specifically, woman often outnumber men (as was the case in the workshop audience), the challenge of the ‘leaky pipeline’ (i.e. loss of female researchers across a range of career stages) still exists. There is therefore an opportunity to increase exposure of researchers from a range of marginalised groups as the marine social science community continues to grow. Overall, there was an acceptance that this gender equality, and indeed other areas of equality and equity, need to remain at the forefront of future conversations, ensuring the growth of an inclusive and diverse community.

3.5. Setting a forward-looking interdisciplinary research agenda for an international marine social science community

Through the workshop, delegates highlighted a number of research and knowledge gaps which they felt should be considered priorities for the marine social science community moving forward. While this is by no means an exhaustive or comprehensive list, it provides a starting point from which a research agenda for marine social sciences can be developed. Similar topics have been grouped together under thematic headings where appropriate – these are presented alongside specific suggestions of research topics in Table 3.

In addition to the specific research questions highlighted in Table 2, workshop delegates also highlighted a number of overarching themes within their discussion. These included, for example, issues relating to resilience, with some delegates discussing a role for marine social sciences in understanding the implications of climate change, the need for, and impact of, adaptation and mitigation approaches, and how this might influence sustainable growth, access to marine resources and issues relating to social equity. In addition, there were calls for social dimensions to be more effectively considered within the concepts of ecosystem services and natural capital ‘to address existing weaknesses’.

There was also a feeling from workshop attendees, that marine social science has a role to play in terms of capturing public, and indeed managers and policy makers, imagination in relation to the sea. While it was recognised by the group that embedding evidence from marine social sciences in policy deliberation can be a challenge, particularly when data can be qualitative or visual in nature, marine social science research captures a depth and breadth that is often missed by more quantitative approaches. This was captured by one delegate who stated that “‘managers want numbers, but they remember stories - this is where we can play a role’”. Understanding the complexities of human relationships with the sea, including how communities feel about their local marine environment and how this influences their use of and acceptance of management, has the potential to directly influence decision making in the future.

4. Marine Social Sciences looking to the future

While the interest, and indeed the evidence base, relating to marine social sciences is clearly experiencing an upward trajectory, it is evident that including marine social science research and data as evidence for policy making remains a challenge. Drawing on the observations from the expert workshop, a series of recommendations are now presented with a view to supporting the growing marine social science community and the inclusion of marine social science research and evidence with global marine policy.

- **Promotion of an interdisciplinary, international research agenda for marine social sciences as a mechanism of achieving international agreements and goals (e.g. UN Decade of Ocean Science for Sustainable Development and the UN Sustainable Development Goals).** While this paper presents five broad themes of research highlighted by workshop attendees as research priorities, it is clear that there remain further opportunities to stimulate and deepen exchanges between diverse disciplines affiliated to social science and between social and natural sciences. Although there is much talk of interdisciplinarity, more efforts are needed to understand how it can be a foundational concept grounded in diversity. Methodological pluralism, allied to rigorous conceptual and theoretical developments, underpins ways for marine social sciences to contribute to understanding relational perspectives of people and the ocean in both policy development and the construction of broader social narratives. In recent years, the conversation around marine sciences has often centred on the achievement of the objectives set out in the UN Sustainable Development Goals (e.g. SDG 14 – Life under Water). More recently, the focus has shifted to the
- **Develop clear pathways to impact and create better links between policy makers and the marine social science community.** Existing networks such as the Marine Social Science Network, MARE and the GMC should continue to raise the profile of marine social sciences. However, while these networks have the potential to bring together researchers and influence research activities, there is also a need to ensure other actors, including relevant policy makers and industry stakeholders are actively engaging with marine social science research and are continuing the conversation to ensure the marine social science research agenda is co-developed, useful and implementable. As evidenced through the discussions at this workshop, embedding social sciences into marine policy and management debates has been a longstanding challenge. However, there are signs of change – for the past two years, the UK’s Marine Science Coordination Committee, a cross government Steering Committee which advises on priorities for UK marine policy, has included a Marine Social Science Task Force, which is co-chaired by the UK’s Department for Environment, Food and Rural Affairs (Defra), providing a more direct route between marine social sciences and policy making. The formation of this group resulted in the inclusion of marine social science focused objectives within the UK Marine Strategy, which is currently under review following public consultation. This model places marine social sciences firmly within marine and coastal policy development in the UK; formation of similar advisory groups or steering committees would support direct inclusion of marine social sciences within national policy in other places. Additionally, on an international scale, workshops and expert advisory groups are being set up to support the achievement of international obligations (e.g. the recent formation of the IUCN People and the Oceans Specialist Group). Crucial to this, is the creation of a cross sector community whose membership includes representatives not only from academia, but also from policy, industry and practice – currently the Marine Social Science Network actively encourages engagement from non-academic actors, recognising the value of on the ground action and application of marine social sciences.
- **Support the growing marine social science community through increasing visibility of research and supporting networking and collaboration opportunities.** There are innumerable conferences and events focusing on the myriad of disciplines encompassed by ‘marine sciences’, and the steady increase in the volume of marine social science topics and themes at international marine events (see for example the International Marine Conservation Congress 2018 programme) must be recognised. However, to the best of our knowledge there are only two regular events that are specifically targeted at marine social scientists – MARE (Amsterdam) and the Society and the Sea (London) conferences. These events are held biannually on alternative years and have garnered a dedicated network of attendees bringing together a collective audience of approximately 600 researchers and practitioners working across marine social sciences. Despite their popularity, it must be recognised that both events are held in north west Europe, meaning attendance can be prohibited by cost, travel time, access, and increasing concerns about the implications of international travel for climate change. There is need to develop a calendar of international

events, increasing the number of events with a specific focus on the human dimensions of the interaction between society and the sea which can be accessed by a broader audience. Recognising that working in silo is not a way to achieve success, this programme of marine social science events should, of course, be supplemented by the increased inclusion of marine social science topics in broader marine, and general environmental, events alongside improved opportunities for remote participation.

- **Undertake a global marine social science stock take.** The volume and diversity of marine social science research is on an upward trend, rising at such a pace that it is sometimes a challenge to keep abreast of the most recent advances or to identify where the most urgent research priorities lie. This paper presents an insight into some of those topics; however, this is by no means an exhaustive assessment and does not accurately represent the breadth and depth of the work carried out under marine social sciences and how this varies in response to cultural, social, economic, environmental and geographic drivers. It is therefore recommended that a global marine social science stock take and mapping exercise is undertaken to identify knowledge gaps, research priorities and an understanding of how this varies geographically (i.e. the UK might have very different research and evidence needs to those of a south Asia nation, for example). A stock-take of this nature has been undertaken through a recent Defra commissioned piece of work, which set out to map existing marine social science research and practice across the UK and to engage with the research community to identify potential priorities for ongoing work (McKinley and Mann, in prep). This work took a multi-methods approach, mapping the current literature and evidence base supporting the development of an evidence base, and engaging with researchers and relevant stakeholders to examine the UK's marine social science community. The co-development approach used in this work could provide a blueprint for a global protocol for understanding the wider marine social science community, existing knowledge gaps and identifying future priorities.

In summary, marine social science is rapidly evolving and draws together many diverse subject disciplines and research communities, each with their own history and experience of engaging with the ocean. While there are vibrant and engaging research programmes in many areas, there is potential to further develop a subject based identity that draws together a broad range of approaches to help reveal the importance of the sea to society in a wide variety of situations from policy making to community and individual values. In a recent book written from a sociology perspective (Hannigan, 2016) states; “*While there is a critical mass of scientific knowledge that illuminates and interrogates oceans from the various vantage points of marine biology, oceanography, physical geography, international law, global institutions / governance and environmental sustainability, it is more unusual to find research undertaken explicitly from a social science perspective*” (pg.3). Within a broader context, there is considerable marine social science research undertaken (as illustrated in the introduction to this paper); however, more efforts are needed to facilitate conversations between diverse disciplines and to create new opportunities for future interdisciplinary marine social science collaborations. Although individuals and groups can move this agenda forward, long term change will require innovative new funding mechanisms that recognise and promote interdisciplinary marine research and policy agendas. This paper presents a starting point for these discussions, highlighting tangible actions that can be undertaken to support and enhance the existing marine social science evidence base and its role in global marine and coastal governance.

CRedit authorship contribution statement

Emma McKinley: Conceptualization, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **Tim Acott:**

Conceptualization, Methodology, Writing - original draft, Writing - review & editing. **Katherine L. Yates:** Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to thank the attendees of the workshop at the MARE X in Amsterdam, June 2019 for their valuable input to the workshop discussions. KY was funded by a NERC Knowledge Exchange FellowshipNE/P00668X/1. Additionally, the authors would like to thank the Marine Social Science Network for their organisation of the workshop and leading this manuscript.

References

- Bavinck, M., Jentoft, S., Scholtens, J., 2018. Fisheries as social struggle: a reinvented social science research agenda. *Mar. Policy* 94, 46–52.
- Bennett, N., 2019. Marine social sciences for the peopled seas. *J. Coast. Manage.*
- Bennett, N.J., Roth, R., Klain, S.C., Chan, K., Christie, P., Clark, D.A., Cullman, G., Curran, D., Durbin, T.J., Epstein, G., Greenberg, A., Nelson, M.P., Sandlos, J., Stedman, R., Teel, T.L., Thomas, R., Verissimo, D., Wyborn, C., 2017. Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation* 205, 93–108.
- Bennett, N.J., Whitty, T.S., Finkbeiner, E., Pittman, J., Bassett, H., Gelcich, S., Allison, E.H., 2018. Environmental stewardship: a conceptual review and analytical framework. *Environ. Manage.* 61, 597–614.
- Börger, T., Beaumont, N.J., Pendleton, L., Boyle, K.J., Cooper, P., Fletcher, S., Haab, T., Hanemann, M., Hooper, T.L., Hussain, S.S., Portela, R., Stithou, M., Stockill, J., Taylor, T., Austen, M.C., 2014. Incorporating ecosystem services in marine planning: the role of valuation. *Mar. Policy* 46, 161–170.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3, 77–101. <https://doi.org/10.1191/1478088706qp0630a>.
- Chan, K.M.A., Satterfield, T., Goldstein, J., 2012a. Rethinking ecosystem services to better address and navigate cultural values. *Ecol. Econ.* 74, 8–18.
- Chan, K.M.A., Guerry, A.D., Balvanera, P., Klain, S., Satterfield, T., Basurto, X., Boström, A., Chuenpagdee, R., Gould, R., Halpern, B.S., Hannahs, N., Levine, J., Norton, B., Ruckelshaus, M., Russell, R., Tam, J., Woodside, U., 2012b. Where are cultural and social in ecosystem services? A framework for constructive engagement. *Bioscience* 62, 744–756. <https://doi.org/10.1525/bio.2012.62.8.7>.
- Christie, P., McCay, B.J., Miller, M.L., Lowe, C., White, A.T., Stoffle, R.W., et al., 2003. Toward developing a complete understanding: a social science research agenda for marine protected areas. *Fisheries* 28 (12), 22–26.
- Ehler, C.N., 2018. Marine spatial planning: an idea whose time has come. In: Yates, K.L., Bradshaw, C. (Eds.), *Offshore Energy and Marine Spatial Planning*. Routledge, pp. 6–17.
- Fletcher, S., Jefferson, R.L., McKinley, E., 2012. Saving the shallows: focusing marine conservation where people might care. *Aquat. Conserv. Mar. Freshw. Ecosyst.*
- Gruby, R.L., Gray, N.J., Campbell, L.M., Acton, L., 2016. Toward a social science research agenda for large marine protected areas. *Conserv. Lett.* 9, 153–163. <https://doi.org/10.1111/conl.12194>.
- Guest, H., Lotze, H.L., Wallace, D., 2015. Youth and the sea: ocean literacy in Nova Scotia, Canada. *Marine Policy* 58, 98–107.
- Halpern, B.S., Walbridge, S., Selkoe, K.A., Kappel, C.V., Micheli, F., D'agrosa, C., Bruno, J.F., Casey, K.S., Ebert, C., Fox, H.E., Fujita, R., 2008. A global map of human impact on marine ecosystems. *Science* 319 (5865), 948–952.
- Hannigan, J., 2016. *The Geopolitics of Deep Oceans*. Cambridge, Polity press.
- Hannigan, J., 2017. Toward a sociology of oceans. *Can. Rev. Sociol.* 54, 8–27.
- Hawthorne, M., Alabaster, T., 1999. Citizen 2000: Development of a model of environmental citizenship. *Global Environmental Change* 9, 25e43.
- Hind, E.J., Alexander, S.M., Green, S.J., Kritzer, J.P., Sweet, M.J., Johnson, A.E., Amargós, F.P., Smith, N.S., Peterson, A.M., 2015. Fostering effective international collaboration for marine science in small island states. *Front. Mar. Sci.* 2, 86. <https://doi.org/10.3389/fmars.2015.00086>.
- Jefferson, R., McKinley, E., Capstick, S., Fletcher, S., Griffin, H., Milanese, M., 2015. Understanding audiences: making public perceptions research matter to marine conservation. *Ocean Coast. Manag.*
- Jentoft, S., Bonnie, J., McCay, B.J., Wilson, D.C., 1998. Social theory and fisheries co-management. *Mar. Policy* 22 (4–5), 423–436.
- Kaplan, I.M., McCay, B.J., 2004. Cooperative research, co-management and the social dimension of fisheries science and management. *Mar. Policy* 28 (3), 257–258.
- Kelly, C., 2018. ‘I need the sea and the sea needs me’: symbiotic coastal policy narratives for human wellbeing and sustainability in the UK. *Mar. Policy* 97, 223–231.
- Leavy, P., 2015. *Method Meets Art: Art-Based Research Practice*. The Guilford Press, New

- York.
- Ledford, H., 2015. Team science. *Nature* 525, 308–311.
- Longo, S.B., Clark, B., 2016. An ocean of troubles: advancing marine sociology. *Soc. Probl.* 63 (4), 463–479. <https://doi.org/10.1093/socpro/spw023>.
- Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington DC.
- Mackay, M.L., Schmitt, M.T., 2019. Do people who feel connected to nature do more to protect it? A meta-analysis. *J. Environ. Psychol.* 65.
- Martin, V.Y., Weiler, B., Reis, A., Dimmock, K., Scherrer, P., 2017. Doing the right thing': how social science can help foster pro-environmental behaviour change in marine protected areas. *Mar. Policy* 81, 236–246.
- McKinley, E., Fletcher, S., 2010. Individual responsibility for the oceans? An evaluation of marine citizenship by UK marine practitioners. *Ocean Coast. Manag.* 53 (7).
- McKinley, E., Fletcher, S., 2012. Improving marine environmental health through marine citizenship: a call for debate. *Mar. Policy* 36, 839–843.
- Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., Watson, R.T., Başak Dessane, E., Islar, M., Kelemen, E., Maris, V., Quaas, M., Subramanian, S.M., Wittmer, H., Adlan, A., Ahn, S.E., Al-Hafedh, Y.S., Amankwah, E., Asah, S.T., Berry, P., Bilgin, A., Breslow, S.J., Bullock, C., Cáceres, D., Daly-Hassen, H., Figueroa, E., Golden, C.D., Gómez-Baggethun, E., González-Jiménez, D., Houdet, J., Keune, H., Kumar, R., Ma, K., May, P.H., Mead, A., O'Farrell, P., Pandit, R., Pengue, W., Pichis-Madruga, R., Popa, F., Preston, S., Pacheco-Balanza, D., Saarikoski, H., Strassburg, B.B., van den Belt, M., Verma, M., Wickson, F., Yagi, N., 2017. Valuing nature's contributions to people: the IPBES approach. *Curr. Opin. Environ. Sustain.* 26–27, 7–16.
- Pita, C., Pierce, G.J., Theodossiou, I., Macpherson, K., 2011. An overview of commercial fishers' attitudes towards marine protected areas. *Hydrobiologia* 670 (1), 289.
- Potts, T., Pita, C., O'Higgins, T., Mee, L., 2016. Who cares? European attitudes towards marine and coastal environments. *Mar. Policy* 72, 59–66.
- Restall, B., Conrad, E., 2015. A literature review of connectedness to nature and its potential for environmental management. *J. Environ. Manage.* 159, 264–278.
- Scoones, I., 1999. New ecology and the social sciences: what prospects for a fruitful engagement? *Annu. Rev. Anthropol.* 28 (1), 479–507.
- Stafford, R., Jones, P.J.S., 2019. Viewpoint ? Ocean plastic pollution: A convenient but distracting truth? *Marine Policy* 103, 187–191.
- Steel, B., Smith, S., Opsommer, C., Curiel, L., Warner-Steel, R., 2005. Public ocean literacy in the United States. *Ocean Coast. Manag.* 48, 97–114.
- UN General Assembly, 2015. *Transforming our World : The Agenda for Sustainable Development*. 21 October 2015, A/RES/70/1, available at: <https://www.refworld.org/docid/57b6e3e44.html> [accessed 7 June 2019].
- Victor, D., 2015. Climate change: embed the social sciences in climate change policy. *Nature* 520, 27–29.
- Voyer, M., Gollan, N., Barclay, K., Gladstone, W., 2015. 'It's part of me': understanding the values, images and principles of coastal users and their influence on the social acceptability of MPAs. *Mar. Policy* 52, 93–102.
- Welsh Government (2016) *Wellbeing of Future Generations (Wales) Act (2016)*. Available from: <http://gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en> Accessed on 1/4/2020.
- Yates, K.L., 2014. View from the wheelhouse: perceptions on marine management from the fishing community and suggestions for improvement. *Mar. Policy* 48, 39–50.
- Yates, K.L., Clarke, B., Thurstan, R.H., 2019. Purpose vs performance: what does marine protected area success look like? *Environ. Sci. Policy* 92, 76–86.