



It's Just Conservation: To What Extent Are Marine Protected Areas in the Irish Sea Equitably Governed and Managed?

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It is not enough to simply designate a protected area. According to the Convention on Biological Diversity's Aichi Target 11, these sites should be governed and managed effectively and equitably. Equitable (i.e., fair and inclusive) conservation is vital to ensuring effective protection of natural resources while maintaining human well-being. Yet, equity tends to be overlooked in protected area assessments. Three marine protected areas (MPAs) in Great Britain, Northern Ireland, and the Republic of Ireland were selected to assess equitable governance and management in the Irish Sea. This is one of the first studies to assess equity across multiple stakeholder groups in MPAs. The Site-level Assessment for Governance and Equity (SAGE) toolkit, developed by the International Institute for Environment and Development (IIED) to address the gap in equity assessments, was used to evaluate equitable governance and management in these MPAs. Based on the three dimensions of equity (recognition, distribution, and procedure), SAGE contains Likert-scale questions to assess good governance by evaluating how different stakeholder groups perceive their protected area's management and how included they feel in decision-making. Quantitative data from SAGE is complemented by qualitative data from semi-structured interviews with stakeholders to understand the impact MPA management has on local communities and MPA users. The results of this study reveal a lack of communication between MPA authorities and local stakeholders. They highlight the need for co-management in the form of inclusive partnerships as an alternative to the current top-down governance approach favored in the United Kingdom and Ireland.

Keywords: marine protected area, equity, governance, environmental management, Irish Sea, marine conservation, stakeholder inclusion, assessment tool

INTRODUCTION

Anthropogenic threats to the marine environment, such as overfishing and pollution, are making effective conservation a necessity to ensure the continued flow of ecosystem services that are vital to the Earth and its inhabitants (Halpern et al., 2008; Claudet, 2011; Frascchetti et al., 2011; Long et al., 2015). Marine protected areas (MPAs) are a popular ecosystem management tool, but

their success depends on several considerations, influenced by both biological and socioeconomic factors (Pomeroy et al., 2005). An MPA is a clearly defined area for the effective protection and conservation of species, habitats, and natural and cultural resources within the marine environment. While initially created solely for biological conservation purposes, MPAs are now additionally designated to promote the sustainable use of natural resources and the protection of ecosystem services (Hill et al., 2016). Marine and terrestrial protected areas (PAs) have been advocated by the United Nations as a conservation tool and there has been a push to designate and establish more PAs worldwide (United Nations Environment Programme [UNEP], 2018). At the Tenth Meeting of the Conference of the Parties (COP10) in Nagoya, Japan (2010), the Strategic Plan for Biodiversity 2011–2020 was laid out. It includes the Aichi Targets, a set of conservation objectives supporting biodiversity and human well-being. Aichi Target 11 focusses on PAs and states:

By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape (Convention on Biological Diversity [CBD], 2011).

Aichi Target 11 clearly establishes the need for equitable management of PAs, yet equity issues may be considered issues of governance rather than management (Franks et al., 2018). Equity issues in a management context are generally rooted in governance and should be approached as such (Franks et al., 2018). Governance – the decision-making processes of managing natural resources – is a strong predictor of whether PAs reach their goals (Dearden et al., 2005). An MPAs overall effectiveness is determined by how well it addresses both biophysical and socioeconomic issues: ‘a particular MPA may be both an ecological “success”—resulting in increased fish abundance and diversity and improved habitat, for example—and a social “failure”—lacking broad participation in management, the sharing of economic benefits, and conflict resolution mechanisms’ (Christie et al., 2003; p. 22). If socioeconomic issues, including inequity, are not addressed, it is likely that any successful biological conservation efforts will be short-lived (Christie et al., 2003; Halpern et al., 2013; Batista and Cabral, 2016) and if stakeholders are not involved in the decision-making and resulting management of a PA, conservation efforts could be met with conflict and resistance (Jentoft et al., 2007; Pita et al., 2013; Soma and Haggett, 2015; Hopkins et al., 2018; Bennett et al., 2020).

Equity is the principle that people should be treated as equals, in a fair and just manner (McDermott et al., 2013). In nature conservation, equity means that all people share the costs and benefits that come from the management and use of natural resources and ecosystem services (McDermott et al., 2013). It plays an important role in MPA governance because it refers to fairness and inclusion of stakeholders. Equity is argued by some experts to be an indicator of

good governance (Dearden et al., 2005; Jones et al., 2013; McDermott et al., 2013; Soma et al., 2015) because ‘perceived inequity undermines resource users’ willingness to comply with conservation rules or participate in MPA processes’ (Jones et al., 2013; p. 12). MPAs can have a significant socioeconomic impact on surrounding communities, which can lead to negative opinions of PAs and make stakeholders less likely to respect the MPAs legitimacy and follow the rules that have been imposed to meet conservation objectives (Jones et al., 2013; Klein et al., 2015; Dawson et al., 2018).

Equity tends to be overlooked in PA assessments, both terrestrial and marine (Klein et al., 2015; Hill et al., 2016; Schreckenberg et al., 2016), and emphasis on expanded area coverage to meet Aichi Target 11 may result in the inequitable distribution of benefits (and burdens) and overshadow the need for effective management (Campbell and Gray, 2019; Johnson et al., 2019; Brander et al., 2020). Equitable (i.e., fair and inclusive) conservation is vital to ensuring effective protection of natural resources while maintaining human well-being (Hill et al., 2016). Research shows that equity plays an important role in the success of PAs (Halpern et al., 2013; Jones et al., 2013; Batista and Cabral, 2016; Dawson et al., 2018), although the extent to which equity has a positive impact on conservation may vary (Halpern et al., 2013; Young et al., 2013). PAs can in turn have an impact on equity if their establishment disproportionately affects some stakeholders over others (Pita et al., 2013; Friedman et al., 2018; Bennett et al., 2020). Equity as it pertains to governance of PAs is poorly understood and requires further research (Franks et al., 2018; Campbell and Gray, 2019). Much of the literature on equity in PAs focusses on low or middle-income countries and on terrestrial ecosystems (Hill et al., 2016; Schreckenberg et al., 2016; Dawson et al., 2018; Friedman et al., 2018).

Equity has not been formally defined with respect to Aichi Target 11 (Campbell and Gray, 2019) and there is only limited evidence on the relationship between equity and effective conservation (Klein et al., 2015; Schreckenberg et al., 2016; Bennett et al., 2020). It can be challenging to measure because ‘equity is associated with concepts of social justice and fairness, respecting that diverse people could have different perceptions and views about what is fair’ (Zafra-Calvo et al., 2019; p. 1). While social equity has been assessed as part of greater management effectiveness tracking tools, these tools do not take into consideration the different dimensions of equity (Leverington et al., 2010; Zafra-Calvo et al., 2019). A further shortcoming of the research on social equity in conservation is its focus on PAs in the global South and in forest ecosystems (Friedman et al., 2018). A review of studies on social equity in conservation ($n = 138$) by Friedman et al. (2018) shows that few (7%, $n = 11$) of the studies surveyed took place in Europe. The purpose of this study is to examine the state of equitable governance and management in MPAs through a case study approach of three sites in the northern Irish Sea. Using a newly-developed site-level assessment tool for governance and equity (known as SAGE), this study identifies equity challenges and best practices to improve MPA governance and management in global North MPAs, provides

suggestions for better stakeholder engagement, and promotes equitable conservation.

Governance and Equity of Marine Protected Areas

Much of the literature on the social dimensions of PAs focusses on the terrestrial environment, with MPAs receiving much less attention (Sowman and Sunde, 2018). This is surprising, as one of the main failures of MPAs in achieving their biological conservation objectives is the lack of involvement from stakeholders in the planning and decision-making process (Agardy et al., 2011; Sowman and Sunde, 2018). However, equity issues may appear less pressing or obvious in a marine context because MPAs generally do not displace people from their homes, but rather from the marine space itself and from access to and use of resources (Campbell and Gray, 2019). Nevertheless, for those whose livelihoods depend on fishing and protein derived from seafood consumption, MPAs can be seen to have a detrimental effect on food security, particularly in the global South (Campbell and Hanich, 2015; Campbell and Gray, 2019). This may be why much of the literature on the socioeconomic impacts of MPAs focusses on the global South and/or exclusively on fishers (Salayo et al., 2006; Gustavsson et al., 2014; Bakker et al., 2019; Gill et al., 2019; Bennett et al., 2020).

Good governance can be described as the interactions that lead to collective decision-making amongst various stakeholders (Dearden et al., 2005; van Tatenhove, 2013). Management is instrumental and tool-oriented, whereas governance addresses ethics and good practices (Jentoft et al., 2007). Governance ‘involves a process of negotiation between, on the one hand, nested general institutions operating at several levels, and on the other hand, state actors, market parties and civil society organizations’ (van Tatenhove, 2013; p. 298). PA governance is typically described as top-down, bottom-up, or co-management (somewhere between these approaches). In bottom-up governance, communities govern MPAs without state involvement, whereas in top-down governance, decisions are made by the state and imposed on community members of the MPA (Jones et al., 2013; Ban and Frid, 2018). Co-management, in between these two governance approaches, is the equitable sharing of decision-making power (Ban and Frid, 2018). However, co-management can be difficult to establish in practice and needs to be integrated into a formal government-supported management plan to truly be considered effective (Ban and Frid, 2018; Vucetich et al., 2018; Voorberg and Van der Veer, 2020).

The governability of a PA depends on several principles (Soma et al., 2015; Bennett, 2016), including accountability; legitimacy; representation; and transparency. These principles of governance can be found in the three dimensions of equity: recognition, procedure, and distribution (McDermott et al., 2013; Pascual et al., 2014). Recognition is the acknowledgment and acceptance of the legitimacy of rights, values, interests, and priorities of a PA's stakeholders (McDermott et al., 2013; Schreckenberg et al., 2016; Dawson et al., 2018; Vucetich et al., 2018). Recognizing a person's rights should also involve the respect of these rights, the lack

of which is a concern for many stakeholders, particularly local, marginalized groups who feel their voices aren't being heard (Schreckenberg et al., 2016).

The main feature of procedural equity is the inclusion and effective participation of all relevant stakeholders in PA designation, implementation, and management (McDermott et al., 2013; Sterling et al., 2017; Di Franco et al., 2020). However, *who* participates is key, as not all participation is created equal (Arnstein, 1969). A study by Gustavsson et al. (2014) highlights the manipulation and passiveness of the participation process in a community-based managed MPA in Zanzibar, Tanzania, where stakeholder representatives are unelected and local people are not involved in development and conservation decision-making. This approach creates an illusion of participation and allows MPA authorities to claim that community participation did indeed take place. Procedure also involves accountability, transparency, and access to justice for dispute resolution (Hill et al., 2016; Schreckenberg et al., 2016; Vucetich et al., 2018). The MPA governing authority and managers as well as local stakeholders should all be held accountable for their actions (or inactions) with regards to equitable conservation management through adequate enforcement (Batista and Cabral, 2016; Schreckenberg et al., 2016). Communication between stakeholders and transparency, coupled with trust and social cohesion within and amongst stakeholder groups, can also lead to effective conservation (Young et al., 2013; Hill et al., 2016). Bottom-up governance, such as community-based management, may be seen as a solution to the often-alienating top-down governance approach favored by governments in the global North (Govan et al., 2008; Ban and Frid, 2018).

The third equity dimension, distribution, refers to the costs and benefits of a PA and how they are distributed between stakeholders (McDermott et al., 2013; Schreckenberg et al., 2016). Much of the policy work and socioeconomic assessments that take equity into account generally focus on the distribution dimension, as loss of income or revenue gains may be easily quantifiable and serve as readily measured indicators (Schreckenberg et al., 2016; Friedman et al., 2018). Dawson et al. (2018) argue that this reliance on material distribution and standardized indicators may be inadequate to properly assess local perceptions of equity, thereby making effective conservation more difficult. Distribution of costs and benefits can be a sensitive topic, as some stakeholders may feel that they have sacrificed more than others and/or did not receive their fair share of the benefits (Schreckenberg et al., 2016; Dawson et al., 2018; Friedman et al., 2018). Distribution is often a series of trade-offs, between resources and their uses and between stakeholder groups (Schreckenberg et al., 2016; Gill et al., 2019). There is no such thing as perfect equity in conservation because these trade-offs are necessary (e.g., which groups should be prioritized over others when resources are limited and why?); indeed, optimal marine conservation outcomes are often achieved without perfect equity (Halpern et al., 2013; Klein et al., 2015). Equity may be considered a matter of perception (what is *fair* and why?) and thus cannot be guaranteed for all (Halpern et al., 2013; Klein et al., 2015). Nevertheless, research shows that equity plays a role in conservation and cannot be excluded from natural resource

governance and management if conservation objectives are to be met (Young et al., 2013; Hill et al., 2016; Dawson et al., 2018; Friedman et al., 2018).

Study Sites

The three MPAs selected for this study are located on the Irish Sea coastline (Figure 1). The Irish Sea separates the islands of Great Britain and Ireland; its coastline extends through England, Scotland, Wales, Northern Ireland (NI), the Republic of Ireland (ROI), and the Isle of Man. The MPAs included in this study cross county, national, and international boundaries and were specifically chosen for this reason, to look at equity across different administrative and spatial scales. These sites were selected based on six criteria linked to MPA effectiveness and chosen to ensure that enough data was available for assessment and analysis: A site was selected if it had multiple conservation designations (1), had an implemented management plan (2) and active monitoring (3), was larger than 100 km² (4), older than 10 years (5), and managed by an authority willing to work on the issue of equity in MPAs (6) (Edgar et al., 2014; Schéré et al., 2020).

Strangford Lough

Strangford Lough is a sea inlet located in County Down, on the eastern coast of Northern Ireland. The lough is known for its biodiversity – containing 72% of marine biodiversity in

Northern Ireland waters – and is home to over 2,000 recorded marine species, while 60,000 people live around its shores and one million within an hour's drive (Christie et al., 2011; Yates et al., 2013; Department of Agriculture Environment and Rural Affairs [DAERA], 2017). The lough provides ecosystem services not only to the local community, but also to day visitors from Belfast, who flock to Strangford Lough on the weekends and especially during the summer. Commercial activities around the lough include agriculture, small fishing operations (about 20 pot fishing licenses), aquaculture, tourism, and recreation.

Strangford Lough is part of the EU networks Natura 2000 and European Marine Sites, as well as the OSPAR Network of MPAs. Strangford Lough is a multiple-designation site (World Database on Protected Areas [WDPA], 2020), boasting seven designation types (i.e., national, European, and international) and 12 individual designations. Arguably one of the most protected MPAs in Europe (and the only MPA in Northern Ireland to have a management plan as recently as 2013), the lough's *Modiolus modiolus* (horse mussel) biogenic reefs – protected under the Habitats Directive – were destroyed due to fishing activities, in particular trawling and dredging, despite being a designated MPA at the time (Johnson et al., 2008; Christie et al., 2011; Jones, 2012; Yates et al., 2013; Fariñas-Franco et al., 2018). Several authors criticize Northern Ireland for not adequately addressing environmental issues until the situation becomes

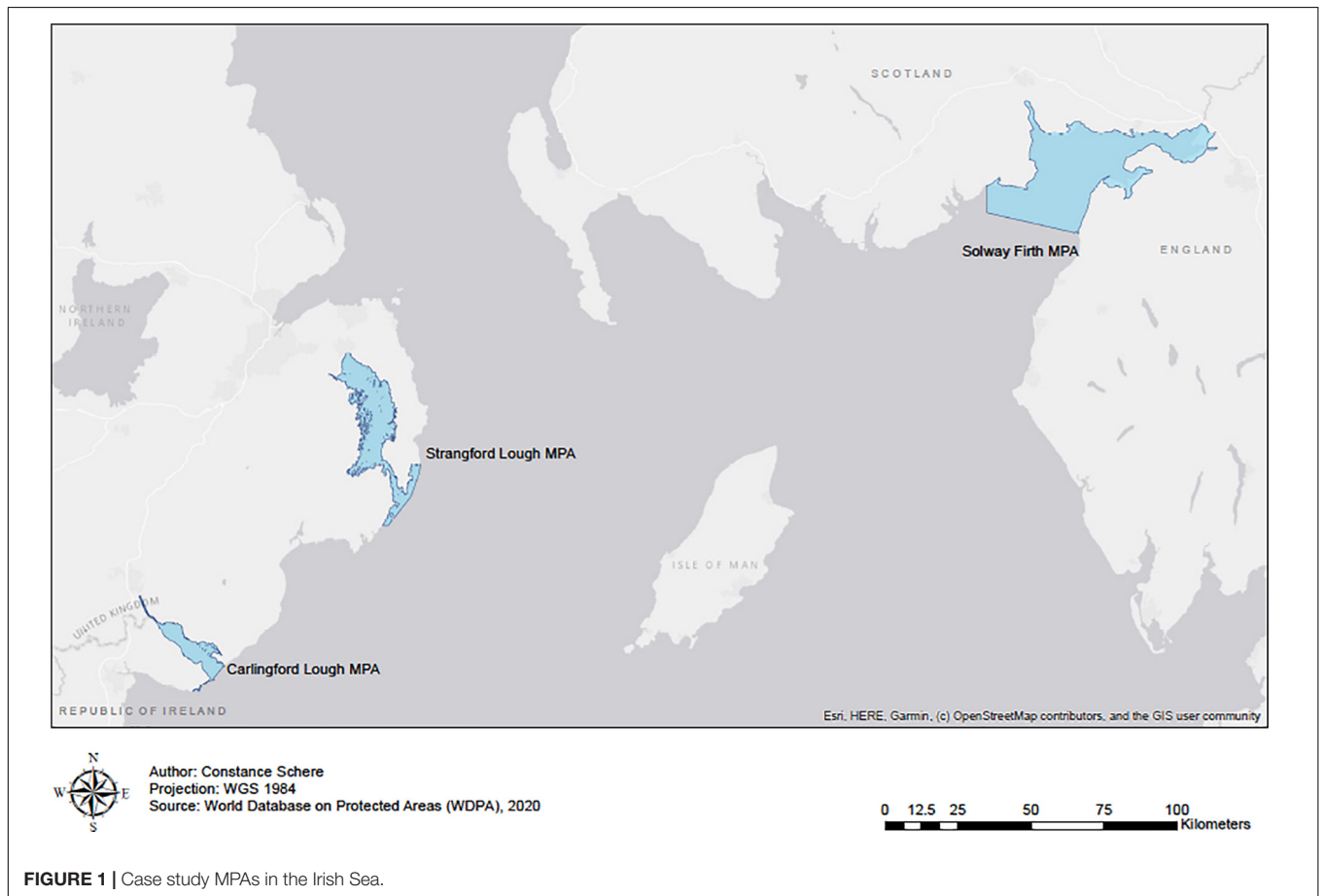


FIGURE 1 | Case study MPAs in the Irish Sea.

critical (Johnson et al., 2008; Smyth et al., 2009; Cooper, 2011; Jones, 2012; Yates et al., 2013). The fate of *M. modiolus* highlights how multiple departments overseeing marine management can be a problem (Cooper, 2011; Yates et al., 2013) and led to calls for an increase in coordination and collaboration between the different authorities overseeing Strangford Lough (Johnson et al., 2008; Smyth et al., 2009; Cooper, 2011; Jones, 2012; Yates et al., 2013). There are currently six management authorities working with the Department for Agriculture, Environment and Rural Affairs (DAERA) on the conservation of Strangford Lough. A new management plan is currently being developed for the lough by DAERA, in collaboration with other management authorities. These authorities include the Northern Ireland Environment Agency (an executive agency of DAERA), Newry Mourne and Down Council, Ards and North Down Council, the National Trust, the Crown Estate, and the Wildlife and Wetland Trust. The Strangford Lough and Lecale Partnership (SLLP) was originally created to handle the management of the lough, but this responsibility is now shared between the various authorities.

The Solway Firth

The Solway Firth is an inlet in the Irish Sea that forms the border between Scotland on the north shore and England in the south. The Solway Firth extends from St. Bees Head, south of Whitehaven in Cumbria (England), to the Mull of Galloway, in the western part of Dumfries and Galloway (Scotland) and spans an area of approximately 3,000 km² (Scottish Natural Heritage [SNH], 2016; World Database on Protected Areas [WDPA], 2020). Much of the firth is surrounded by coastal lowlands and small mountains, with saltmarshes and sandbanks present on both the north and south shores (Lloyd et al., 1999). The surrounding area is mainly rural, with fishing and farming dominating the local economy, as well as tourism (Solway Firth Partnership [SFP], 2020). Seafood is a major industry in the Solway, dominated by scallop fisheries, aquaculture, and seafood processing – which employs over 1,500 people (Solway Firth Partnership [SFP], 2015). The Solway Firth is home to Robin Rigg Wind Farm, which currently boasts 58 operational turbines in Scotland and is serviced from England (Solway Firth Partnership [SFP], 2020). The firth is a popular tourist destination, offering beaches and hiking trails along its coastline and opportunities for water sports, sailing, sea angling, and other recreation (Solway Firth Partnership [SFP], 2020).

The Solway Firth's large area boasts several conservation designations, such as Luce Bay and Sands SAC in Scotland and Allonby Bay MCZ in England (World Database on Protected Areas [WDPA], 2020). The inner estuary, however, is a transboundary site. This area, known as the Solway Firth and Upper Solway Flats and Marshes, spans approximately 436 km² and has six designations (Department for Environment Food and Rural Affairs [DEFRA], 2019; World Database on Protected Areas [WDPA], 2020). Part of this area is an Area of Outstanding Natural Beauty (1964) on the English coast (World Database on Protected Areas [WDPA], 2020). Governance and management of the Solway Firth MPA falls under the responsibility of the United Kingdom Marine Management Organisation (MMO), the Inshore Fisheries and Conservation Authority (IFCA), Natural

England, NatureScot (formerly known as Scottish Natural Heritage), and Marine Scotland (Department for Environment Food and Rural Affairs [DEFRA], 2019). The Solway Firth Partnership (SFP), an independent charitable body, was created to support the local economy while respecting and protecting the area's heritage and natural features (Solway Firth Partnership [SFP], 2015). The SFP brings together stakeholders from both coasts of the firth to improve the sustainable management of the Solway (O'Higgins et al., 2019). In its own words, the SFP's objective is 'to provide a framework for marine planning and management that enables engagement by everyone with an interest in our marine and coastal area' (Solway Firth Partnership [SFP], 2015).

Carlingford Lough

Carlingford Lough is located some 60 km south of Strangford Lough. It is also a sea inlet and forms part of the border between Northern Ireland (County Down, United Kingdom) and the Republic of Ireland (County Louth). Inflowing catchments drain an area of 470 km², the majority of which are located in Northern Ireland: surface water quality from the Camlough, Clanrye, Kilbroney, Newry, and Whitewater rivers is poor due to agricultural runoff, urban pollution, and sediment loads (ALICE Project, 2016). Newry, located on the banks of the Clanrye river that flows into Carlingford Lough, is the largest settlement in the lough's catchment area (population: approximately 26,000 in 2011) but industrial activity is minimal (ALICE Project, 2016; Department of Agriculture Environment and Rural Affairs [DAERA], 2016). Warrenpoint and Greenore, located on the northern shore of the lough, are significant commercial ports and shipping traffic is considerable (Department of Agriculture Environment and Rural Affairs [DAERA], 2016). Other activities around and within Carlingford Lough include agriculture, fishing (commercial and recreational), aquaculture, forestry, tourism, recreational boating and sailing, water sports, and other forms of recreation (e.g., birdwatching, hiking, mountain biking, etc.). The lough is located about an hour to an hour and a half drive from both Dublin and Belfast and the Dublin-Belfast railway line stops at Newry station, making Carlingford Lough an accessible and popular weekend destination.

Like Strangford Lough, Carlingford Lough has several national, European, and international designations. The lough has been designated an MPA because of its species richness, particularly its avian biodiversity. Demersal fishing activities – such as trawling, dredging, or pot fishing – and organic pollution from sewage present major threats to benthic species (Greathead et al., 2014; Bastari et al., 2018). Carlingford Lough's MPA status is under the authority of the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland and the National Parks and Wildlife Service (NPWS), part of the Department of the Arts, Heritage and the Gaeltacht in the Republic of Ireland. Fisheries and aquaculture are managed by the Lough Agency, which was set up as one of the cross-border bodies under the 1998 Good Friday Agreement to 'provide sustainable social, economic and environmental benefits [...] through the effective conservation, management, promotion and development of the fisheries and marine resources of the Foyle

and Carlingford areas' (Loughs Agency, 2021). Formal maritime boundaries for Carlingford Lough have never been agreed upon, so appropriate management of the lough may require an all-Ireland approach in the form of a single, cross-border institution, similar to the Solway Firth Partnership model between Scotland and England (Campbell and Hanich, 2015; O'Higgins et al., 2019).

MATERIALS AND METHODS

A limitation of many assessment tools of effectiveness and equity of PAs is that they are based solely on the views of PA authorities and management and thus yield biased results, with managers perceiving higher levels of effectiveness than other stakeholders (Campbell and Gray, 2019; Giglio et al., 2019). The need for an adequate equity assessment tool that considers the views of various stakeholder groups of PAs has resulted in the development of a new, separate equity toolkit, developed by the International Institute for Environment and Development (IIED), in collaboration with conservation professionals from various global institutions in government, NGOs, and academia. Named the Site-level Assessment for Governance and Equity (SAGE), this toolkit directly addresses the lack of understanding of equity and aims to further promote the implementation of equitable management of PAs (International Institute for Environment and Development [IIED], 2021). SAGE is designed as a score card, wherein participants answer Likert-scale questions to the best of their ability on the topics of governance and equity. Scores range from 1 (very negative – no measures are in place) to 4 (very positive – effective measures exist), with the possibility of selecting 'I don't know' (coded as a missing value).

Originally designed as a 1-day workshop, a revised version¹ of the toolkit was transformed into a 20-question online questionnaire (Table 1) to reach a wider audience during the COVID-19 pandemic. All 10 principles of equity and governance are represented, with at least one question covering each principle. The anonymous online questionnaire, created using Qualtrics XM (Qualtrics, 2020), was distributed to potential participants via gatekeepers such as the SLLP, the SFP, and various recreational clubs and businesses located in proximity to the MPAs. Flyers detailing the study and containing a QR code to access the online questionnaire were also handed out at random to passersby at each site, to promote participation beyond the scope of gatekeeper-recruited participants. Participants selected the type of stakeholder they identify with and answered the toolkit questions based on this position. The main stakeholder groups were: MPA management; marine recreational users (recreational fishers, yachters, coastal rowers, sailors, divers, etc.); coastal recreational users (birdwatchers, wildfowlers, dog-walkers, hikers, etc.); local business operators (e.g., commercial fishers, aquaculturists, shop owners, restaurateurs, sports

TABLE 1 | SAGE questions by equity and governance principle.

Principle	Q#	Question
Respect for rights	Q1	What proportion of community members do you think are aware of the right to use (MPA) for commercial and recreational purposes?
	Q2	Do you think that community members who have the right to use (MPA) for commercial and recreational purposes are able to exercise this right?
Respect for actors	Q3	How do you feel people who work for (MPA) (e.g., site wardens/rangers) regard community members and their interests in (MPA)?
	Q4	How do you feel community members regard people who work for (MPA)?
	Q5	Do you perceive there to be any discrimination (e.g., favoritism of one stakeholder group over another) against any groups of stakeholders?
Participation	Q6	Do you think there are any opportunities (e.g., a committee or meeting) for relevant stakeholders to participate in decision-making on MPA-related issues?
	Q7	How much influence do you believe your stakeholder group has on MPA-related decision-making?
Transparency and accountability	Q8	Do you think MPA managers receive information from stakeholders on threats (e.g., illegal or detrimental activity) to the MPA?
	Q9	What type of processes do you think exist for resolving disputes that relate to the MPA?
Dispute resolution	Q10	Do you think these dispute resolution processes succeed in resolving MPA-related disputes?
	Q11	How do you think the people responsible for enforcing MPA laws (e.g., site rangers/police) behave when interacting with community members?
Law enforcement	Q12	In your opinion, how effective are enforcement activities in reducing law-breaking?
	Q13	Do you think the organizations responsible for dealing with conflicts between stakeholder groups have the skills and resources to do the job properly?
Impact mitigation	Q14	How and by whom do you think decisions are made on the allocation of benefits [e.g., permits or other means to access/utilize (MPA) for recreational or commercial purposes] to communities?
	Q15	Do you feel the quality and quantity of the benefits received by communities is in line with what was agreed?
Achieving objectives	Q16	Do you think the process for developing and reviewing MPA strategies and plans involve key stakeholders?
	Q17	Do you think some aspects of MPA management have been changed in response to learning from experience?
	Q18	Do you think the objectives of protecting marine species and habitats [e.g., (key species)] are being achieved?
Coordination and collaboration	Q19	How good do you think coordination and collaboration is between different stakeholders at site level?
	Q20	How good do you think coordination and collaboration is between stakeholders at lower and higher (i.e., administrative) levels?

¹The revised version of SAGE used in this study is based on the original version of the toolkit. The findings from this study and its application at other sites worldwide have contributed to the development of a second version, which is currently being piloted by IIED (for more information, see: <https://www.iied.org/site-level-assessment-governance-equity-sage>).

rentals, etc.); local community members (i.e., people residing along the coast of the MPA); and tourists (i.e., day visitors or holidaymakers). The opportunity to enter in a prize draw for three Amazon gift cards (one gift card valued at £100/€100 and

two valued at £50/€50 at each site) was used as an incentive to recruit participants. This study received ethical approval from King's College London (ethical clearance reference number: LRS-18/19-13395).

This study used a mixed methods design in order to better understand the state of governance and equity at each MPA site (Creswell and Plano Clark, 2011). The quantitative data drawn from the toolkit responses was used to represent the general views of various stakeholder groups. The results of the online questionnaire helped guide the types of questions that were asked in the semi-structured interviews. Participants for semi-structured interviews were recruited through the online questionnaire, wherein interested parties could choose to be interviewed after submitting their questionnaire responses. The qualitative data derived from the semi-structured interviews was used to better understand the personal views of stakeholders (Sterling et al., 2017) and to provide evidence to justify the scores attributed to each question in the toolkit.

Quantitative data were coded, analyzed, and visualized in SPSS 26 (IBM Corporation, 2019) and RStudio (RStudio PBC, 2020). The semi-structured interviews were held via videoconference software or over the phone due to distancing restrictions caused by the COVID-19 pandemic. These interviews were recorded and transcribed. They were then uploaded into NVivo 12 (QSR International, 2019) and coded into nodes (Table 2) that represented the different themes that arose during the semi-structured interviews (e.g., access, awareness, communication, etc.). The qualitative data was compared with the quantitative data to understand stakeholders' views of equity in their MPAs.

The three online questionnaires garnered a combined total of 131 responses: Strangford Lough ($n = 55$), the Solway Firth ($n = 47$), and Carlingford Lough ($n = 29$). A combined score for Strangford Lough's management that had been tallied during a pilot SAGE workshop was added to the analysis, bringing Strangford Lough's responses to a total of 56. The participants of the online questionnaire were evenly represented: 51% male

and 49% female; however, more males were interviewed than females (62 and 38%, respectively). All participants who wanted to be interviewed had the chance to be interviewed. In total, 16 stakeholders were interviewed (Strangford Lough, $n = 8$; the Solway Firth, $n = 5$; Carlingford Lough, $n = 3$), which represents approximately 10% of total participants for each site. The relatively low response rate may be attributed to the difficulties posed by COVID-19 restrictions to interact more closely with stakeholders and potential participants: People were wary of close contact with strangers, despite taking the necessary precautions (masked, gloved, and maintaining a 2-m distance), and the lockdowns meant the majority of businesses were closed and most people did not leave their homes. Although approximately 100 flyers were distributed at each site, this study therefore relied most heavily on gatekeepers such as the SLLP to recruit participants.

RESULTS

Quantitative Results

The SAGE toolkit responses show that scores (1–4 scale) from non-management stakeholders tended to be lower compared to management scores. A mean score was attributed for principles with multiple questions to visualize trends in participant responses.

Strangford Lough

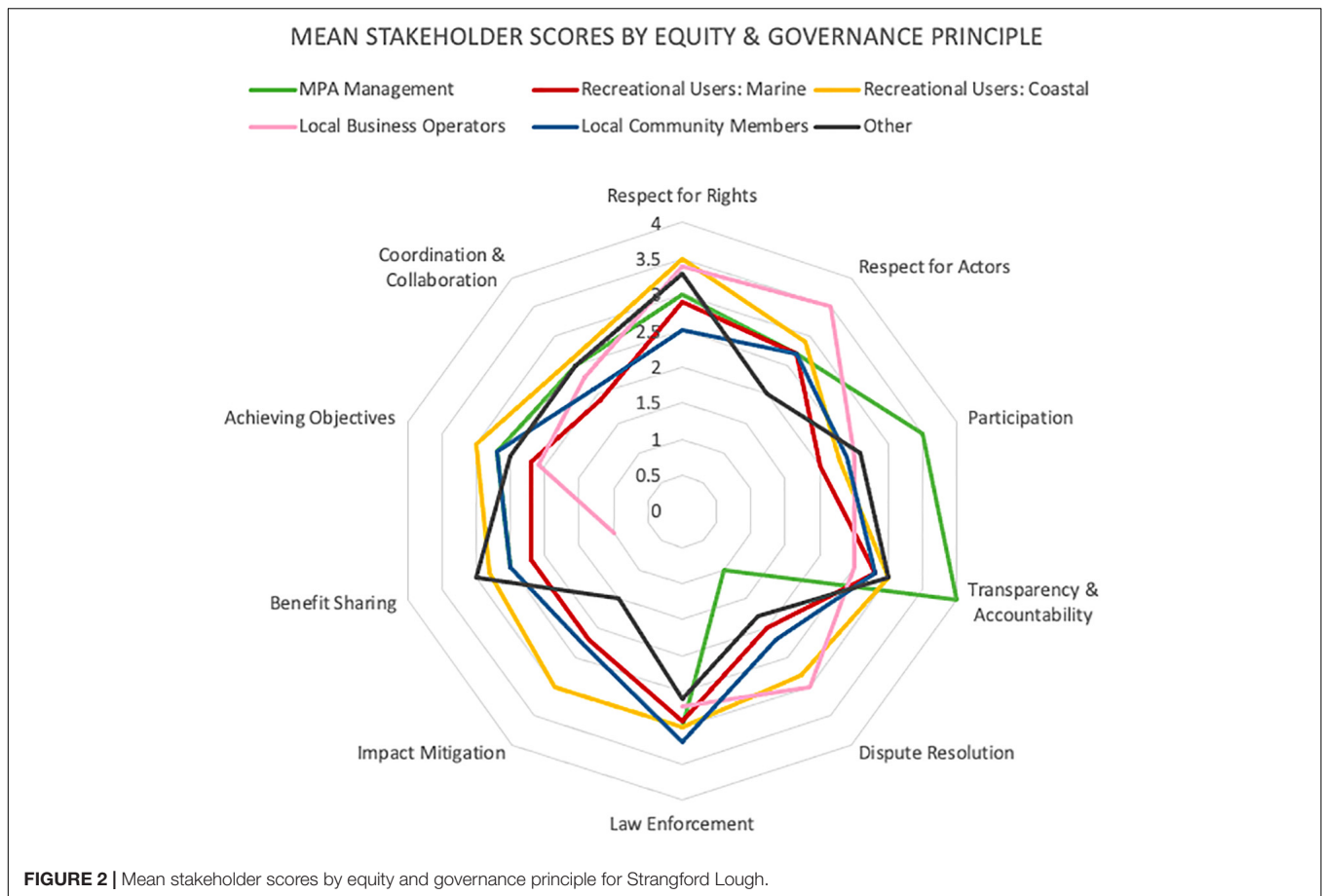
Strangford Lough's stakeholders were divided into six groups: MPA management, marine recreational users, coastal recreational users, business operators, community members, and others. Stakeholders in the 'Others' group did not feel they belonged to any of the proposed groups (e.g., scientists conducting research on Strangford Lough). Responses to the online questionnaire show that MPA management at Strangford Lough perceived that *participation* (Q6 and Q7) and *transparency and accountability* (Q8) efforts were successful, while other stakeholder groups disagreed (Figure 2). All stakeholder groups agreed that efforts to *achieving objectives* (Q16, Q17, and Q18) were lacking and that there is a need for improved *coordination and collaboration* (Q19 and Q20). Missing scores exist where stakeholder groups did not know how to respond to questions, such as for *impact mitigation* (Q13). Missing values made up 37% of total responses to all questions. For a complete description of the data for Strangford Lough, please see Appendix 1 in **Supplementary Materials**.

The Solway Firth

The Solway Firth's stakeholders were made up of: MPA management, coastal recreational users, business operators, community members, and tourists. There were no marine recreational users, which may be attributed to the inner Solway's strong tidal action and turbidity. Responses to the online questionnaire show that MPA management at the Solway Firth assessed its efforts rather critically compared to other sites (Figure 3). Missing responses for the Solway Firth made up 54% of all responses. All stakeholder groups tended to agree

TABLE 2 | Nodes used to code qualitative data in NVivo 12.

Node	Description
SLLP	Comments about the Strangford Lough and Lecale Partnership.
SFP	Comments about the Solway Firth Partnership.
Loughs Agency	Comments about the Loughs Agency.
Access to the MPA	Access to the MPA for commercial or recreational use.
Awareness of MPA status	Awareness of the existence of the MPA.
Communication with the public	Communication between MPA authorities and local stakeholders regarding the MPA, its purpose, ongoing conservation efforts, opportunities to participate, education materials and resources.
Environmental management	Successes and failures of environmental conservation in the MPA.
Law enforcement	Relating to law enforcement.
Resource constraints	Relating to staff and budget allowances and constraints.



(similar scores) on the state of *respect for actors* (Q3, Q4, and Q5). *Coordination and collaboration* (Q19 and Q20) was given high scores by MPA management and tourists, but *in situ* stakeholders (recreational users, community, and businesses) were more critical (lower scores). For a complete description of the data for the Solway Firth, please see Appendix 2 in **Supplementary Materials**.

Carlingford Lough

Stakeholder groups at Carlingford Lough were made up of: MPA management, marine recreational users, coastal recreational users, business operators, community members, and tourists. Carlingford Lough had the lowest response rate of all three sites, despite it being an international cross-boundary site and arguably the most affected by related issues such as Brexit and different national regulations. Results from the online questionnaire show that MPA management gave high scores (scores of 3 and 4) for almost all principles, while community members and marine recreational users viewed equity in more conservative terms (see **Figure 4**). *Transparency and accountability* (Q8) scores were high for businesses and community members, but on this principle MPA management's views were slightly more critical. Missing responses made up 44% of all responses to questions and exist where stakeholders did not know how to answer the question due to lack of knowledge regarding the lough's

governance and management, such as in *benefit sharing* (Q14 and Q15) for the businesses group. For a complete description of the data for Carlingford Lough, please see Appendix 3 in **Supplementary Materials**.

Case Study Site Comparison

In order to compare perceptions of different stakeholders across all sites the following groups were compared: management, recreational users, business, and community members. A new stakeholder group was created, consolidating marine and coastal users into one category: recreational users. This was due to the lack of marine users in Solway Firth. Tourists were also removed from the analysis, as this group was absent at Strangford Lough, while the group named 'Other' was also excluded due to its absence at the Solway and Carlingford Lough. Differences between stakeholder groups and between MPAs for each of the twenty questions are also visualized in **Figure 5**, where one can see how management perceptions differ compared with other stakeholder groups. For example, management scores across all sites were generally higher than for other stakeholder groups, particularly at Carlingford Lough. *Coordination and collaboration* (Q19 and Q20) are viewed as weak in all three sites, particularly by non-management stakeholders. For a complete description of the data for stakeholders and MPAs, please see Appendices 4, 5, respectively, in **Supplementary Materials**.

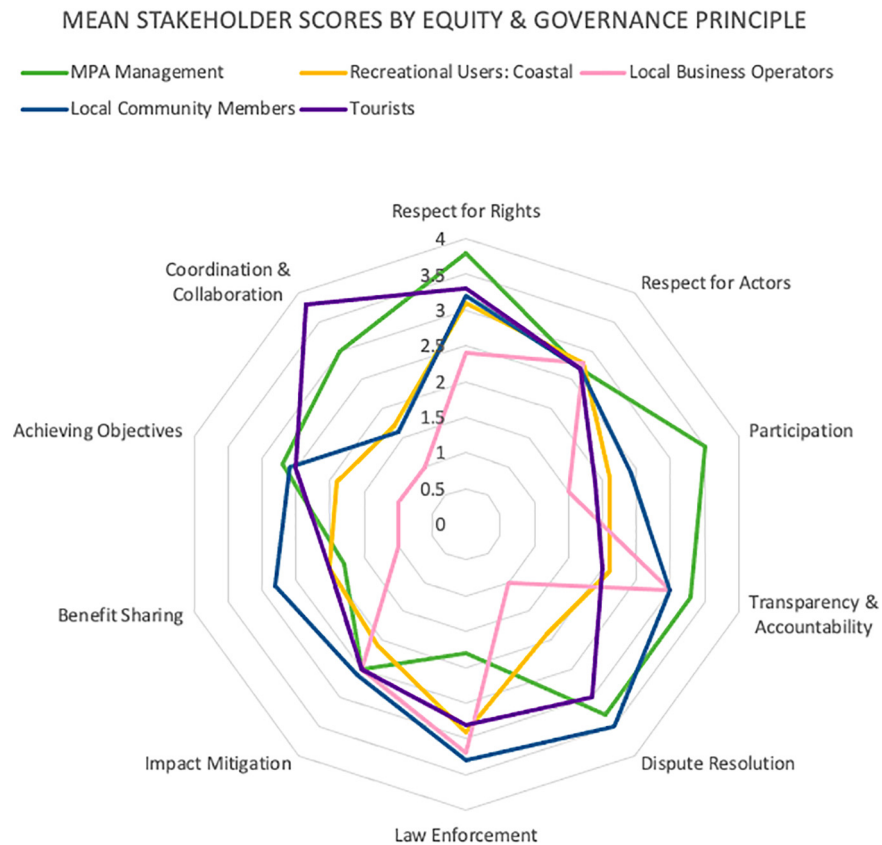


FIGURE 3 | Mean stakeholder scores by equity and governance principle for the Solway Firth.

Qualitative Results

SAGE revealed a number of disconnects between how MPA management views its efforts and performance in terms of governance and equity and the perceptions of different stakeholder groups across all sites, but particularly at Carlingford Lough. SAGE also identified issues specific to each MPA, such as access at Strangford Lough and litter on the Solway Firth. The comments written by participants to the online questionnaire and the semi-structured interviews reinforced much of the quantitative data provided by the SAGE questionnaire.

Governance Structures

SLLP

The Strangford Lough and Lecale Partnership (SLLP), originally the Strangford Management Committee and then the Strangford Lough Advisory Committee, serving as a liaison between stakeholders and government, has seen its role diminish over the years. Its offices were once located in Portaferry, making the SLLP accessible to local stakeholders and having its presence felt on the lough. A more bottom-up approach to the governance of Strangford Lough, wherein issues were discussed within the SLLP and brought to government to collaborate on decision-making, has shifted to an exclusively top-down approach – where management decisions are made and imposed on stakeholders without taking their views into account.

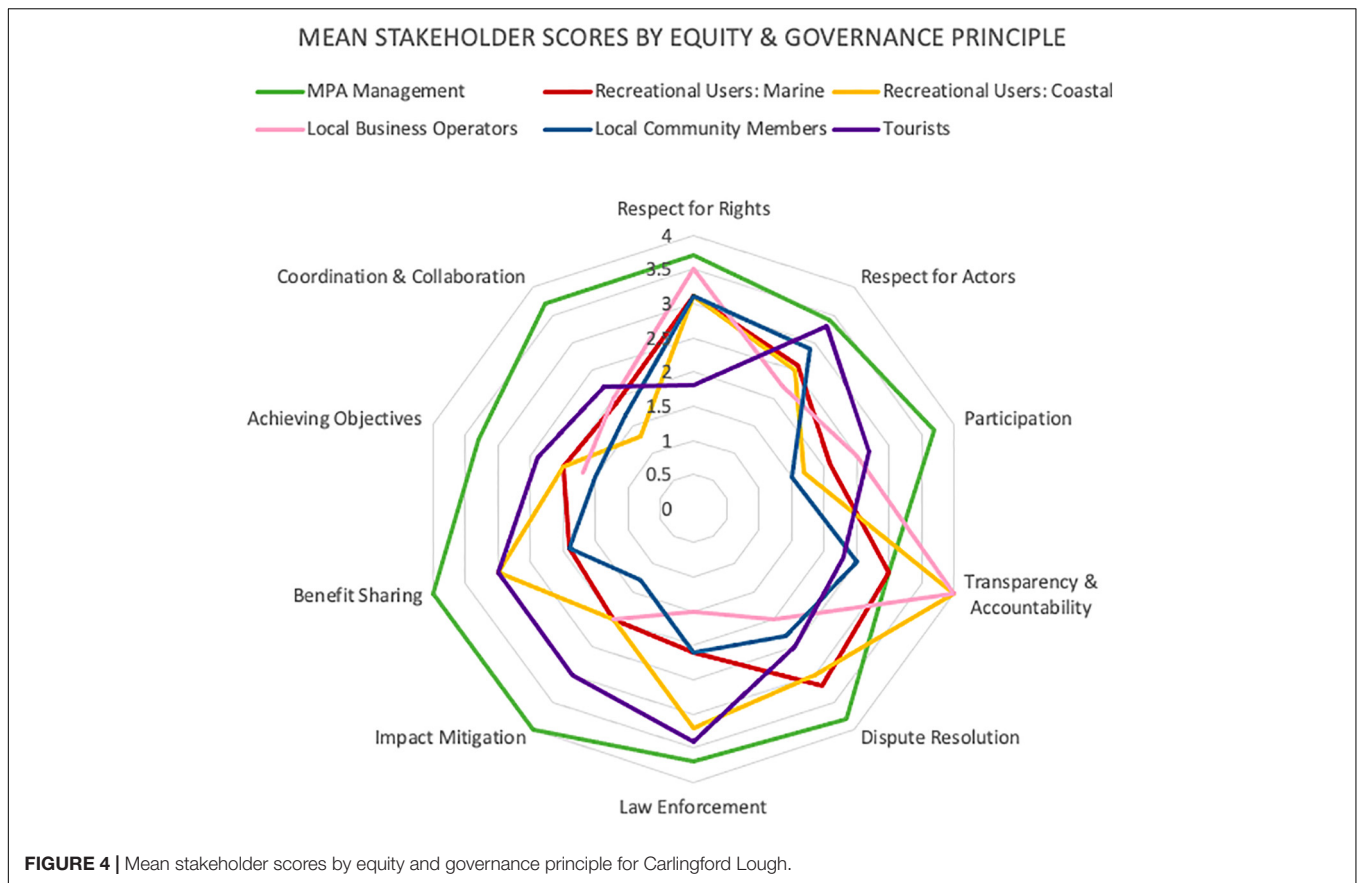
‘The Strangford Lough Advisory Committee (now SLLP) has been a very valuable sounding ground – however, in more recent times its influence and the level of engagement between the MPA and the committee is much more limited. Decisions are made and then informed to the committee. In the past proposals were presented, discussed and revisions taken on board before decisions were made.’ – *Strangford Lough marine user*.

‘[SLLP] had premises in Portaferry. So they were in the center of things. Now, they’re in Downpatrick. And it’s sort of remote. [...] I would see none of them now, whereas you used to see them regularly going across the ferry and that sort of thing. And you could chat about related things when you did meet them. [Now] they don’t give the impression of being taken seriously.’ – *Strangford Lough community member*.

The SLLP office is now located within the Newry Mourne and Down Council offices, in Downpatrick, about 10 km away from Strangford Lough, and while it is viewed positively by stakeholders, according to a marine user, it is now ‘just fragmenting constantly. It’s quite sad, actually, because it was quite joined up.’

SFP

The governance structure of the Solway Firth means that a number of different actors (both public and private) are responsible for its management. The Solway Firth Partnership



(SFP) brings together these different actors with stakeholders to discuss issues on the Solway as they arise and communicates Solway-related news to the local communities through its quarterly magazine, *Tidelines*. Its team is actively involved in the promotion and conservation of the Solway Firth, but a criticism of the SFP is that there is a perceived bias toward the Scottish side of the Solway by the SFP: ‘Because [the SFP office is] based on the Scottish side [in Dumfries], and also the way it’s funded through Marine Scotland, [. . .] there is very much a bias toward the Scottish side. But that’s not the intention of the organization. It’s always attempting to do more on the other side, often by working with the Solway Area of Outstanding Natural Beauty,’ explains a Solway Firth coastal user. The SFP collaborates with the Solway Firth Area of Outstanding National Beauty (AONB) whose offices are located across the Solway in Silloth, England.

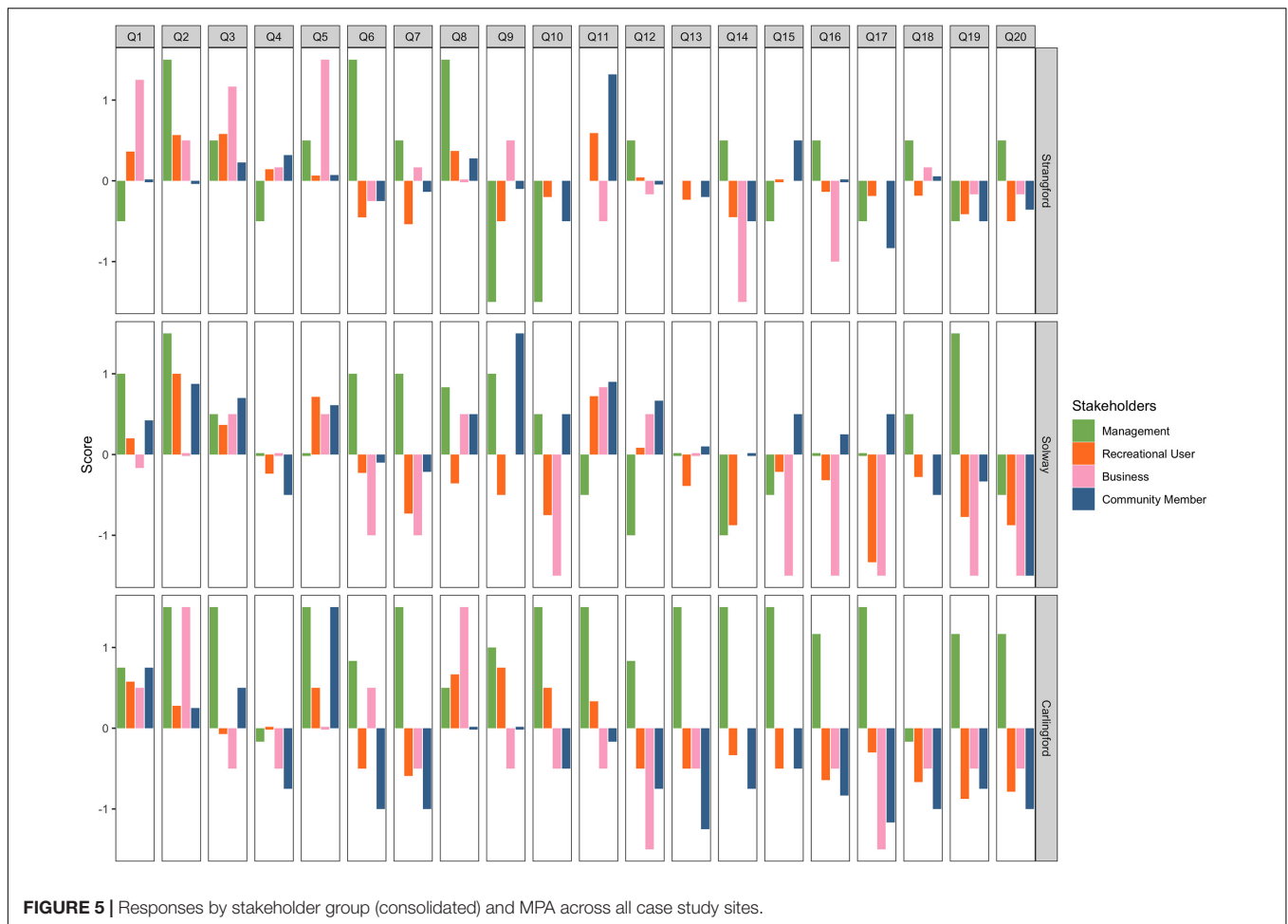
Loughs Agency

Unlike the other two sites, Carlingford Lough has no active partnership involved in its conservation and management. It does have the Loughs Agency, which is described as being well situated to work with stakeholders, the county councils, and the governments of Northern Ireland and the Republic of Ireland on transboundary issues related to the lough (House of Commons and Northern Ireland Affairs Committee, 2018; O’Higgins et al., 2019). However, its work focusses on fisheries and aquaculture and its presence is not felt on Carlingford Lough, despite having

an office in Carlingford village. Participants describe the Loughs Agency as ‘toothless’ and ‘having no face’ at Carlingford Lough. According to one coastal user, ‘We just don’t see them. I don’t know why they can deliver fantastic work up in Foyle and ignore Carlingford. [. . .] [W]hat history is there that’s meant that there’s this inequality?’

Access to the MPA

Stakeholders should be able to exercise their *rights* when it comes to the use of an MPA. While stakeholders have the right to use the water, they are limited in their ability to freely access it at Strangford Lough (Outdoor Recreation Northern Ireland, 2018). According to one member of MPA management, ‘[I]t’s access for the general public [that] is limited. For those of us who know and [are] members of your [yacht or sailing] clubs or something like that, or members of the National Trust, it’s a lot easier, but a lot of people can’t afford that.’ As many interview participants pointed out, there are only two public slipways at Strangford Lough: at Portaferry and Strangford village, both of which are located in the southern part of the lough – the Narrows, a channel linking the lough to the Irish Sea. The other main points of access to the water are located on privately-owned land or require paid membership to a yacht or sailing club to utilize, making access both geographically and financially prohibitive. Some participants, particularly marine users, reported conflicts over use of Strangford Lough for recreational or commercial



purposes. These conflicts occurred within stakeholder groups, as well as with the MPA authorities.

‘From the fisheries point of view, [...] we’re basically barred out with a large section of the lough, the midsection, pretty much the amount of fishermen are allowed into the lough is severely restricted, and [...] diminishing. [...] They put a restricted licensing scheme. [...] [The MPA authority]’re wanting [to] make a fishery in Strangford Lough extinct and this is their way of doing it.’ – *Strangford Lough marine user*.

‘Some sailing club members seem to think they own the lough.’ – *Strangford Lough marine user*.

The Solway Firth does not have an access issue in the way its Irish (NI and ROI) counterparts do because of the Land Reform (Scotland) Act 2003, known as ‘freedom (or right) to roam’ (Scottish Parliament, 2003). This means that, save for a handful of exceptions, people have the right to walk through privately-owned land and access inland water as long as they do so responsibly, making accessing the Solway Firth relatively simple. As one coastal user explains, ‘The right to roam, I just kind of take it for granted because it’s always been such a part of how in Scotland, [...] how we, you know, access the natural environment. There are obviously areas of the Solway coast that

are inaccessible in terms of the Ministry of Defense area. But they’re really limited.’ The Solway Firth also differs from the other two MPAs in this study because of its lack of marine users as a stakeholder group. This can partially be attributed to the inner Solway’s geology and its aging population. Its large tidal range and quicksand can make it dangerous for water sports and, despite current preservation efforts, the Solway’s ancient fishing tradition of haaf netting is dying out (Solway Firth Partnership [SFP], 1996; Peters, 2020).

Awareness of MPA Status

A recurring theme flagged in both the quantitative and qualitative data is a lack of awareness by all stakeholder groups about marine conservation at Strangford Lough and the Solway Firth and, in particular, about their management. Many lifelong residents of the Strangford Lough area claimed they were unaware that Strangford Lough is an MPA and those who did know about its conservation importance did not know who was responsible for its management and monitoring, nor whom to contact regarding lough-related issues.

‘I am not sure a significant number of the residents know or fully understand about [the] MPA. I have lived here for my entire life and I am unaware as to who the [MPA management] are and how

I would go about contacting them.’ – *Strangford Lough community member*.

‘I have lived beside Strangford Lough all my life but was unaware of these MPAs and their roles. I feel that the community requires more awareness on this issue.’ – *Strangford Lough community member*.

At the Solway Firth, low scores for *respect for actors* may be attributed to the fact that awareness of the firth’s management is largely unknown as, when prompted, many participants explained that they were unaware of who was responsible for the Solway or that it was even protected.

‘I’ve lived and walked on the Solway for 15 years and have no clue who MPA [management] are. They aren’t visible to me.’ – *Solway Firth coastal user*.

‘I live on the Solway coast but have never heard of the MPA. I walk the coast daily and have never seen a warden or ranger in my life.’ – *Solway Firth coastal user*.

‘There [are] a lot of different protections coming from different places, different legislation, protecting different things, but also protecting overlapping things. Everyone knows it’s an important area. [...] But I would say that therein lies confusion of how its protected, what different designations they are, why they’re there, and who manages them as well.’ – *Solway Firth coastal user*.

Communication With the Public

This lack of awareness persists at the Solway Firth, as despite the presence of an active partnership (SFP) promoting the firth’s environmental and cultural importance, stakeholders across all groups highlighted a need for more improved *coordination and collaboration* and more opportunities for *participation* for the local population. Those with an established interest in the Solway know where to find information, but someone new to the area may not.

‘This is a sparsely populated [area] with an aging and declining population – very few of whom access the MPA. Annual public forums occur as well as stakeholder meetings – but attendance is poor.’ – *Solway Firth coastal user*.

‘[The] timing of events and meetings can leave those with no transport unable to contribute. [We] need more specific public engagement at large and local events.’ – *Solway Firth coastal user*.

‘There’s no signposting [...] in terms of sort of public engagement, you know, articles in local papers or [...] anything like that really.’ – *Solway Firth community member*.

‘I think there’s a lot of people who are very active, and the organizations do make an effort to try and involve people from all different sectors and different strata of society. And if people choose not to be involved, it’s not because they don’t have the opportunity.’ – *Solway Firth community member*.

While means for *coordination and collaboration* and *participation* exist at Strangford Lough, participants across all stakeholder groups reported being unaware of when public forums were held. Many stakeholders have become wary of public consultations from MPA authorities because they feel that

their voices are not being heard and that these consultations are merely a formality.

‘If anybody appears in [a stakeholder’s] yard, wearing yellow jacket and carrying a clipboard, their past experience has not been good. [...] I think the people who are involved in getting the opinion of the various stakeholders need to bear in mind the sensitivities and I think they don’t, at least [...] the stories I hear suggest that they don’t.’ – *Strangford Lough community member*.

‘I don’t feel at all empowered with my local community. I would get involved, but I never hear of anything.’ – *Strangford Lough marine user*.

Participation and coordination and collaboration remain poor at Carlingford Lough as well. One local business owner claims, ‘Public consultations are manipulated to minimize participation,’ as consultations are not advertised in local newspapers. A coastal user explains, ‘There’s nobody out there telling us that [forums are] happening. [...] Maybe there [are] formal communications between organizations, but there doesn’t seem to be any communication at all [...] to the general public.’

At all sites, some participants found the authorities responsible for the management of the MPAs inaccessible and unresponsive to issues brought forth by stakeholders:

‘We’ve ended up with [...] a political class that don’t see the sea as part of their constituency [...] unless they represent a large commercial port [or] fishing port.’ – *Solway Firth community member*.

‘[We wanted to] get rid of the *Spartina [anglica]*, an invasive species. [...] But you need permission. And that’s not easy to get, and [NPWS] ignore you and your emails go into the ether and never get answered.’ – *Carlingford Lough coastal user*.

Respondents expressed frustration at the lack of communication about conservation work:

‘People don’t want [to be] engaged with to then have the results not turn into anything or [...] put in a report that gathers dust on a shelf somewhere, they want to see the actual impact that their feedback has.’ – *Solway Firth a coastal user*.

[DAERA need to] ‘publish and publicize the results [of ecological surveys] in ways that are actually user-friendly. Because sometimes you get to the data produced, and you just go, like, no one’s gonna read this. You’ve got to produce some sort of factsheet that’s user- friendly and is easy to read in plain English.’ – *Strangford Lough marine user*.

Environmental Management

Stakeholders across all groups at the Solway Firth (including management) recognized that more efforts could be made in *achieving objectives* (Q16, Q17, and Q18). Litter was the most important issue brought up by participants, as the Solway’s tides and weathering events bring in litter from all around and wash them up on shore. Beachgoers and fishers are also accused of littering on the Solway, and agricultural practices contribute to the problem: According to one coastal user, ‘On busy days the Sandhills [Beach] bin is always overfull. It needs [to be] emptied more so rubbish doesn’t blow into the sea. [There’s] slurry from flooded farm land. Nothing is getting done about this.’ Litter is

the responsibility of private landowners as well as the county councils, and a large-scale project to tackle litter on the Scottish coast, known as SCRAPbook, has just come to a close due to lack of funding (SCRAPbook, 2020). At Strangford Lough, the destruction and subsequent restoration of the *Modiolus* reefs became a matter for the European Union, as DAERA failed to protect these fragile biogenic habitats: One manager explained, 'If it wasn't for the European Commission and for the NGOs in Northern Ireland, none of the work to restore the reefs in Strangford Lough would have ever taken place.'

Law Enforcement

Stakeholders noted a distinct absence of MPA authorities – DAERA in particular – at Strangford Lough and Carlingford Lough and some participants felt that conservation of the loughs was low on the Northern Ireland government's list of priorities. A similar sentiment was expressed with regards to *law enforcement* (Q11 and Q12) at Strangford Lough, which generally falls under the remit of the Police Service of Northern Ireland's Wildlife Crimes Unit. However, participants who tried to get in touch with law enforcement at Strangford Lough reported being met with disinterest:

'So [I] called the PSNI [about jet skis on Strangford Lough], who were also mystified and [didn't] really think it was something that they should have been [called about] and [they had] more important things to do.' – *Strangford Lough marine user*.

At Carlingford Lough, efforts to report environmentally-damaging activities also appear to have gone unheeded:

'[DAERA] have an obligation under this law, that law, [they]'ll tick a box about how [they] do site surveys, but we've reported multiple issues of damage, environmental damage, animal by-product dumping and everything. And [DAERA's] answer is "We don't have the resources to do that."' – *Carlingford Lough business owner*.

Resource Constraints

The perceived lack of involvement on the part of MPA management in lough-related issues at both Strangford Lough and Carlingford Lough has been attributed by some participants to a lack of resources. Budget cuts and redistribution of personnel (Department of Finance, 2018; National Trust, 2020; O'Sullivan, 2021) within the organizations and agencies responsible for the loughs have made monitoring and communication between stakeholders and MPA management increasingly difficult.

'DAERA have appointed people and wardens to check on the fisheries. However, it has stumbled a bit because of staff changes. [...] There were enormous budgetary pressures. [...] I do believe that they have the intention, not always the resource, but the intention to monitor [...] very effectively.' – *Strangford Lough management*.

'There was a girl who was employed as the ranger [...] a few years ago, but that post has now gone. [S]he was actually very good at engaging with people as well.' – *Strangford Lough marine user*.

'I feel like they were doing the best they can with what they have.' – *Carlingford Lough coastal user*.

DISCUSSION

This study is the first to assess equity and governance in MPAs using the recently-developed SAGE tool and one of the first to look at equity across multiple stakeholder groups in PAs – both marine and terrestrial (Zafra-Calvo et al., 2019). Across all case study sites, similar issues arise. Awareness is a major obstacle to equitable conservation, as many stakeholders didn't know they had the right to participate in MPA decision-making. Lack of awareness can make *participation* (Q6 and Q7) and *coordination and collaboration* (Q19 and Q20) between stakeholder groups more difficult, and this study highlights a need for more public awareness and engagement opportunities at all three sites (Agardy et al., 2011; Soma and Hagggett, 2015; Johnson et al., 2019; Morf et al., 2019). Confusion over designations and their objectives also means that participants are uncertain about their MPAs conservation importance and what restrictions exist and why.

Adding to the confusion are the complex governance structures of these MPAs, with various actors responsible for different aspects of the MPAs (Jones et al., 2013). This makes it difficult for stakeholders to know to whom to turn to with issues such as restrictions or to report lawbreaking and it can be discouraging when stakeholders are met with disinterest when they finally contact the appropriate person or organization. Stakeholders also criticized the lack of *coordination and collaboration*, particularly surrounding environmental reporting and stakeholder engagement. The questionnaire results show low scores from all stakeholder groups (excluding management). Stakeholders feel that their views are not taken into account during consultations or forums, echoing findings of other studies on MPA governance (Gustavsson et al., 2014; Soma and Hagggett, 2015; Rush and Solandt, 2017; Sowman and Sunde, 2018; Morf et al., 2019).

As both the quantitative and qualitative data show, the top-down and centralized approach to governance favored in the United Kingdom and Ireland results in greater disparity between management and local stakeholders and lower perceived levels of equity by the latter (Jones, 2012; Jones et al., 2013; Ban and Frid, 2018; Sowman and Sunde, 2018). Participants at all sites reported a disinterest from government agencies, with some citing times when local knowledge was disregarded by MPA authorities and expressing frustration at lack of public engagement around conservation issues. This approach to governance may also be linked to reactive management due to centralization: by not incorporating local ecological knowledge and stakeholder experiences in management and – to an extent – monitoring, MPA authorities may miss key issues and introduce conservation measures too late (McKenna et al., 2008; Jones et al., 2013; Morf et al., 2019). Such a reactive rather than proactive approach to management is illustrated in the aforementioned *M. modiolus* case at Strangford Lough (Johnson et al., 2008; Smyth et al., 2009; Cooper, 2011; Jones, 2012; Yates et al., 2013; Fariñas-Franco et al., 2018). In 2003 and then again in 2011, the Ulster Wildlife Trust lodged a complaint to the European Commission over the NI government's failure to protect horse mussel beds, resulting in the government facing a fine of over £8 m (McKimm, 2011, 2012).

Partnerships such as the SFP – and, to a certain extent, the SLLP – may help bridge the gap between government and local communities, and perhaps provide an alternative approach to governance, somewhere between the bottom-up approach of community-based management and the current top-down approach (Govan et al., 2008; Jones, 2012; Rush and Solandt, 2017; Ban and Frid, 2018; Johnson et al., 2019; O’Higgins et al., 2019). A type of co-management, partnerships should be integrated into MPA management plans in order to be given the chance to be successful (Rush and Solandt, 2017; Ban and Frid, 2018; Voorberg and Van der Veer, 2020). At the time of publication, new management plans are being developed for Strangford Lough and Carlingford Lough, and this would be an ideal opportunity to integrate stakeholders and an active and representative partnership or committee into these plans. This is particularly topical at Carlingford Lough, where new infrastructure is being designed to accommodate the post-Brexit customs checks at Warrenpoint (Campbell, 2020), which will undoubtedly impact the lough’s conservation and its local communities. Bringing lough-related issues to light is Love Your Lough, a volunteer-led grassroots environmental group of local stakeholders at Carlingford Lough (on both sides of the border) – but no formal statutory body currently exists to manage these issues and provide stakeholders with an official platform from which to meet with government agencies. The Loughs Agency has been proposed as a potential partnership and cross-boundary institution for local management to serve Carlingford Lough (and Lough Foyle) in a similar vein as the SFP, but there are currently no plans to expand the Loughs Agency’s role (House of Commons and Northern Ireland Affairs Committee, 2018; O’Higgins et al., 2019).

A lack of financial resources is often cited by participants in the two Irish sites as being part of the problem. Indeed, financial resources are a major obstacle to effective conservation (Rush and Solandt, 2017; Singer and Jones, 2018). Budget cuts mean Strangford Lough no longer has a site-specific officer. The Irish National Parks and Wildlife Service’s funding has decreased by 70% since 2008 (O’Sullivan, 2021): County Louth (Carlingford Lough) has one ranger to cover the entire county. Formal volunteer action (such as a partnership or committee) and an investment in technology to improve monitoring may help alleviate financial pressures (Rush and Solandt, 2017; Singer and Jones, 2018). This study shows that stakeholders care about their marine environment and the presence of advocacy groups such as Love Your Lough, community membership of the SFP, and stakeholder participation in citizen science projects such as Coastwatch and Seasearch demonstrate that there are volunteers willing to work toward more effective conservation of their MPAs and they should be given the chance to be included in decision-making through partnerships or co-management (Rush and Solandt, 2017; Singer and Jones, 2018; Johnson et al., 2019; Voorberg and Van der Veer, 2020).

Despite low response rates and sampling limitations in this pilot study, the data show that SAGE can nevertheless help identify major issues surrounding equity and governance in PAs, allowing PA management and governing bodies to make more informed decisions that take into account the views of local

stakeholders. The online version of SAGE used in this study has its limitations, as participants have to navigate the assessment tool on their own. In-person workshops have the added benefit of facilitators to assist stakeholders in SAGE reporting, but may be time or cost-prohibitive for stakeholders to attend. A 1-day online workshop, or one that is spread out across multiple sessions, may be one possible solution.

Marine protected areas management may need to regain the trust of certain stakeholder groups to ensure equitable governance (Bennett et al., 2020). The considerable number of ‘I don’t know’ responses (missing values) to the questionnaire data demonstrates the need for more communication from MPA authorities to stakeholders about their role in the conservation of these marine areas and how it can impact them. It also suggests that the principles concerned may be less relevant in the context of a particular MPA, although this may also indicate a lack of understanding from stakeholders as to processes available to them. For example, the questions for *dispute resolution* (Q9 and 10), *impact mitigation* (Q13), and *benefits sharing* (Q14 and Q15) had the highest missing values across all sites and stakeholder groups (76, 58, and 62%, respectively). While questions were reworded with input from stakeholders at the pilot workshop at Strangford Lough to make them more widely understandable, these aforementioned principles were not raised by stakeholders in semi-structured interviews as issues of concern, even when prompted. Understanding the issues that are important to stakeholders and fostering collaboration between these groups and MPA management to tackle these issues can lead to more equitable and effective conservation (Christie et al., 2003; Jentoft et al., 2007; Halpern et al., 2013; Soma and Hagggett, 2015; Schreckenberget al., 2016).

CONCLUSION

The relationship between equity and MPAs has been little studied (Bennett et al., 2020), making this study one of few published on the subject. It is also one of the first studies to assess the perceived equity and governance of multiple stakeholder groups in MPAs (Bennett et al., 2020). The results of this study in the Irish Sea show that the top-down approach to governance favored by the United Kingdom and the Republic of Ireland complicates communication and collaboration between stakeholders and management authorities, due to the perceived inaccessibility of the MPA agencies. The shift in the SLLP’s role from management group to advisory board and its move from the shores of Strangford Lough to the offices of the county council 10 km away illustrates the centralization of governance away from the communities it is meant to support. It is worth noting that the SLLP remains positively viewed by Strangford Lough stakeholders and therefore could potentially take on a larger role once again following the SFP model. To improve stakeholder engagement and participation at Carlingford Lough, the Loughs Agency could also be redesigned to represent local stakeholders beyond fishing and aquaculture. The results of this study show that a lack of communication and inclusion are the biggest threats to equity in these Irish Sea MPAs, but that many

stakeholders are willing to get more involved if given the chance. The literature suggests that equitably managed PAs have a greater chance of being ecologically successful (Christie et al., 2003; Halpern et al., 2013; Batista and Cabral, 2016), although more case study-based research may be needed to explore this socio-ecological relationship. Incorporating inclusive partnerships into management is one step in the right direction to achieving objectives while ensuring equitable conservation. As one marine user at Strangford Lough put it, ‘While there’s lots of things that need to be done, how much worse would it be if there was nothing [done] at all?’.

DATA AVAILABILITY STATEMENT

The original contributions generated for this study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by King’s College London Research Ethics Office (Ethical clearance reference number: LRS-18/19-13395). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CS and KS contributed to the conceptualization, design, and methodology of this study. Fieldwork was conducted by CS,

with KS also participating in the pilot workshop at Strangford Lough. Data analysis (quantitative and qualitative) was done by CS, with NJ contributing to statistical analysis. CS visualized the data. The first draft of the manuscript was written by CS. All authors contributed to manuscript revision, read, and approved the submitted version. CS is supervised by KS and TD.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fmars.2021.668919/full#supplementary-material>

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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