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RESEARCH

Does marine planning enable progress towards adaptive governance in marine systems? Lessons from Scotland's regional marine planning process

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Abstract

This paper examines marine planning in Scotland and the extent to which it constrains or enables change towards adaptive governance. An in-depth case study of the partnership-based regional marine planning process is presented, based on interviews and documentary analysis. Drawing on adaptive governance theory, analysis focussed on key themes of: (1) local governance and integration across scales; (2) participation and collaboration; (3) learning, innovation and adaptability; and (4) self-organization. Results present regional marine planning as an interface between hierarchical and collaborative governance based on empowerment of regional actors and an attempt to enable coexistence of 'top-down' arrangements with experimentation at smaller scales. In this system, national government provides legal legitimacy, economic incentives and policy oversight, while the partnerships support collaboration and innovation at the regional level, based on strong leadership and participation. Contrasting experience of partnership-working is evident between the large and complex region of the Clyde and the island region of Shetland, where devolved powers and a more cohesive and community-based stakeholder group better facilitate adaptive governance. Overall findings of the study show the tensions of institutionalizing adaptive governance and provide insights into how marine planning contributes to governance of marine systems. Firstly, vertical integration between central and decentralized authority in multi-level marine planning arrangements is challenged by an unclear balance of power and accountability between national government and regional marine planning partnerships. Secondly, the interaction between marine planning and existing policy, planning and management emerged as critical, because marine plans may only operate as an instrument to 'guide' management and prevailing, limited adaptive capacity in broader management structures constrains adaptive outcomes. Lastly, adaptive governance requires incremental and rapid response to change, but limited financial and technical resources constrain the depth and scale of reflection and ability to act. Understanding the contribution of marine planning requires clarification of the interaction between marine planning and other management (the extent to which it can influence decision-making in other domains) and, in addressing governance deficiencies, attention is also required on the adaptive capacity of existing and emerging legislative frameworks which govern decision-making and management of activities at sea.

Keywords Marine spatial planning · Adaptive governance · Regional marine planning · Local governance

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Introduction

Traditional approaches to governance need to change in order to address the intractable challenges of sustainability faced by society (Jentoft and Chuenpagdee 2009; Berkes 2010). Social-ecological systems are complex, nested and dynamic with unexpected outcomes and are not effectively addressed through linear, fragmented, 'command-and-control' models of governance (Holling and Meffe 1996; Meadowcroft 2002). Adaptive governance and fields including sustainability science, participatory governance, deliberative democracy and others provide state of the art theoretical insights on emergent features of governance for 'sustainability', which is adaptive and resilient. These include the following: governance operating across multiple levels with sharing of decision-making power to enable attending to context-specific issues shaped by local conditions (Ostrom 2010; Hooghe and Marks 2009); involving a wider range of stakeholders through collaborative, deliberative and participatory approaches (Plummer et al. 2013); and being learning-based and adaptive to respond to changing circumstances and deal with inherent uncertainty (Folke et al. 2005). While adaptive governance cannot be mandated, it can be facilitated by legal mechanisms which allow governance to respond to dynamic social and ecological challenges over time (Camacho and Glicksman 2016; Cosens et al. 2017; Craig et al. 2017). Changing institutional arrangements can also provide 'windows of opportunity' for institutional innovation and for adaptive governance practice to emerge (Olsson et al. 2006).

As a new institutional arrangement intended to improve governance of marine resources, marine planning is being increasingly adopted worldwide, but its contribution in this regard remains an important research question. In Scotland, marine planning has been advancing since the Scottish Sustainable Marine Environment Initiative (SSMEI) in 2006 which aimed to "develop and test new approaches of delivering sustainable marine management and planning at a local level".[1] Later, the UK's Marine and Coastal Access Act (2009) and the Marine (Scotland) Act 2010 ('the Act') introduced legal requirements for statutory marine planning and Scottish Government adopted a two-tier system of marine planning. This includes an overarching national phased development of Regional Marine Plans (RMP) addressing 11 Scottish of territorial waters and which is currently underway in the Clyde and Shetland Marine Regions. This approach is intended to enable learning through 'natural experiments' in different jurisdictions and is described as an 'evolving process' by Scottish Government,[2] and the design of the statutory planning process has been directly informed by regional experience as 'pioneers' in marine planning practice (Kelly et al. 2014). This context and history forms a valuable case for study and, drawing on adaptive governance theory, we consider to what extent the regional marine planning process in Scotland enables features of adaptive governance to emerge, along with apparent conditions or constraints.

Theoretical framework

Adaptive governance refers to "the evolution of the rules and norms that promote the satisfaction of underlying human needs and preferences given changes in understanding, objectives, and the social, economic and environmental context" (Hatfield-Dodds et al. 2007: 4) and is essential for dealing with complexity and uncertainty associated with rapid global environmental change (Chaffin et al. 2014). Since conception of the term by Dietz et al. (2003), it has gained prominence as an analytical framework to understand governance of social-ecological systems, drawing attention to the collaboration (vertical and horizontal) and learning (experiential and experimental) among actors in governance, to facilitate adaptation and increase resistance to undesirable change (resilience) (Armitage et al. 2009; Chaffin et al. 2014; Craig 2019).

Governance includes the processes of steering or guiding human activity and mediating what society wants from environmental systems, recognizing that government must negotiate both policy and implementation with partners in public, private and voluntary sectors (Pierre and Peters 2005). An important distinction is drawn here between *governance*, where one agent or group of agents has influence or indirect control over the decisions or behaviours of others and *management* (or *governing*) which refers to situations of direct control over resources and the behaviour of agents (Hatfield-Dodds et al. 2007). While connected, adaptive governance "expands the focus from the management of ecosystems towards addressing the complexity of broader social contexts within which people make decisions and share power" (Folke et al. 2005: 444) and acknowledges more clearly the complexities of multi-scale governance.

Implementing adaptive governance can be constrained by prevailing institutions including legal and regulatory frameworks which are often not be designed to be adaptable (Chaffin et al. 2014; Craig et al. 2017). Tension exists between the need for institutional stability versus the need for flexibility and change through experimentation (Pierre and Peters 2005; Craig et al. 2017), requiring a balance between 'top-down' structures and smaller scales of governance (Garmestani and Benson 2013). Understanding how adaptive approaches can coexist with contemporary institutional arrangements is essential, with more work needed to understand arrangements which facilitate the emergence of adaptive governance (Chaffin et al. 2014).

[1] https://www2.gov.scot/Topics/marine/seamanagement/regional/activity/SSMEI

[2] https://www2.gov.scot/Topics/marine/seamanagement/regional

Table 1 Dimensions of adaptive governance forming the analytical framework for the study

Dimension of adaptive governance	Questions for analysis of regional marine planning
Local governance, power-sharing and integration	Is there a perception of greater power at the regional level through RMP? How do devolved arrangements through marine planning interact with other levels?
Participation and collaboration	Do marine planning arrangements support greater participation and collaboration among actors?
Learning, innovation and adaptability	What is the capacity for learning and innovation? Is there adaptability to respond to change through marine planning?
Self-organizing and supporting activities	What self-organizing activities are evident in relation to RMP?

Adaptive governance is increasingly applied as a framework for understanding environmental governance, including of marine resources. Österblom and Folke (2013) reveal the role of interplay between actors, networks, organizations and institutions in the emergence of adaptive governance of the Southern Ocean; this is built upon by Valman and Österblom (2015) who highlight the need for improved consultation and information exchange and the need to develop evaluation mechanisms which help improve compliance, organizational effectiveness and conflict resolution in supporting adaptive governance in the Baltic Sea. Tuda et al. (2019) consider adaptive governance in a transboundary conservation initiative in the Western Indian ocean, highlighting the positive contributions of social proximity and existing collaborative networks for learning, but the lack of compliance mechanisms, information and scientific input, and resource constraints as limitations. As yet, few studies consider marine planning from this perspective; recently, Craig (2019) highlighted the potential role of marine spatial planning in the US to foster the emergence of adaptive governance by promoting legitimate consideration of climate change adaptation measures for aquaculture, through public participation, collaboration and 'experimentation with accountability' (Craig 2019: 1).

Although there is no single model of adaptive governance (Hatfield-Dodds et al. 2007; Djalante et al. 2011), it is possible to identify four key dimensions of institutionalized adaptive governance (Chaffin and Gunderson 2016; Djalante et al. 2011). These dimensions are described below and summarized in Table 1 along with the research questions used in this study.

Local governance, power-sharing and integration across levels

Adaptive governance scholarship promotes governance that distributes decision-making across local to regional scales (Wyborn 2015), recognizing that polycentricity, sharing of power and reduced emphasis on 'top-down' governmental control is needed to manage social-ecological systems (Hooghe and Marks 2009; Ostrom 2010). This involves institutional arrangements structured to involve actors across state, private sector and civil society in decision-making, at multiple scales and levels. Smaller units can better reflect local context, make problems more tractable and respond more quickly to learning and experience (Berkes 2010). This is supported in environmental policy by the established principle of subsidiarity, whereby management should be decentralized to the lowest appropriate level[3]. However, the *integration* of multi-level governance arrangements is crucially important, with vertical and horizontal interplay between institutions needed to address resource management robustly across scales (Folke et al. 2005; Berkes 2010). While focussing on the merits of adaptive governance, we therefore do not exclude hierarchical, centralized management and accepts that modes need to coexist (Berkes 2002; Stojanovic and Ballinger 2009). Understanding the interface between different levels of governance remains largely untested in multi-level marine planning.

Participation and collaboration

Collaboration and participation is fundamental to adaptive governance, involving a wide range of stakeholders to share responsibilities, support learning and innovation and enhance decision-making in resource management. High density of co-operative action encourages more diverse perspectives on decision-making and enables integrated knowledge production on problems and their dynamics (Smith and Stirling 2006). Deliberation supports reconciling competing objectives and perspectives through negotiation and communication (Berkes 2002). Facilitating this in practice is not straightforward and arenas which propose to address 'consensus', 'public interest' and negotiated goals of 'sustainability' are vulnerable to underlying power dynamics, and pre-existing inequalities, a lack of trust or ineffective government can significantly hamper participation and collaboration (Djalante et al. 2011). Attention is needed to institutional arrangements which structure participation in collective decision-making, and ensuring democratic legitimacy and inclusivity in marine

[3] Convention on Biological Diversity (CBD) Guidelines: The Ecosystem Approach. https://www.cbd.int/doc/publications/ea-text-en.pdf - principle 4

planning is a topic of recent debate (e.g. Flannery et al. 2018).

Learning, innovation and adaptability

Adaptive governance relies on iterative adjustments of goals and strategies (Norström et al. 2014), involving a wide range of actors across multiple levels and scales (Pahl-wostl et al. 2008; Galaz et al. 2012). The capacity to reflect and respond to experience is critical to enable governance to adapt more quickly (Koontz et al. 2015), providing flexibility to deal with uncertainty and abrupt change (Allen et al. 2011; Chaffin et al. 2014). Challenges include the higher costs and lower efficiency of 'adaptive' responses and 'trial and error' approaches, and in reconciling new adaptive approaches with the rigidity and path dependence of existing institutions (Craig et al. 2017). Social learning is a key contributor to adaptive governance and is considered emergent based on participation and collaboration in management (Pahl-wostl et al. 2008) and entails collective learning, reflexive practice and action (Wyborn 2015). Marine planning should be inherently adaptive (Ehler 2008) and responding to learning at the social and institutional level is necessary to refine practice and improve governance.

Self-organizing and supporting activities

Self-organization includes emergent behaviour and actions by individuals which supports adaptive governance, through formal and informal networks of individuals, organizations, agencies and institutions at multiple organizational levels (Folke et al. 2005; Plummer et al. 2013). Through these networks, actors interact in a collaborative and creative process, drawing upon a range of knowledge sources, to solve management problems (Berkes 2010). Self-organizing activities include trust-building, sense-making and consensus-building, visioning, leadership (e.g. in mobilizing support and managing conflicts), as well as developing knowledge and social networks committed to change (Leach et al. 2010). The value of 'shadow networks', where actors operate and co-ordinate independently of regulatory requirements, and 'bridging networks' that facilitate communication between government and non-governmental groups across scales are recognized (Olsson et al. 2006; Galaz et al. 2012). Leadership is important in linking actors, initiating partnership among actor groups and compiling and generating knowledge. Polycentric approaches based on self-organization require 'anchoring' in more formal negotiation processes to act consistently with higher levels of government (Galaz et al. 2012), but they can also be enabled by supportive legislation and governmental policies (Folke et al. 2005) and potentially through nested marine planning arrangements.

Marine planning in Scotland

Marine planning is a holistic process intended to address multiple and competing demands on marine resources to achieve economic, social and ecological objectives based on principles of adaptive management, participation and integration (Douvere 2008). It is being adopted worldwide, with around 140 marine planning initiatives in 70 countries as reviewed in August 2018.[4] In Scotland, Scotland's National Marine Plan (2015)[5] was developed by Marine Scotland[6] and sets out strategic policies for the sustainable development of the nations' marine resources out to 200 nautical miles. Responsibility for developing the 11 RMPs is delegated by national government to Marine Planning Partnerships (MPPs), intended 'to allow more local ownership and decision-making.'[7] Public authorities responsible for the regulation (authorization or enforcement) of licensable marine activities (such as aquaculture, dredging or shoreline construction[8]) must take decisions in accordance with the plan and the policies they contain.[9] The MPPs may consist of public authorities (or a single authority in the case of Scottish islands[10]) and stakeholders who reflect marine interests in the region,[11] rather than a single national authority as in most other applications of marine (spatial) planning (Jones et al. 2016). Other subnational marine planning initiatives tend to be led by national agencies, such as in England where development of six subnational marine plans is being led by the Marine Management Organization,[12] or in Iceland where the National Planning Agency leads on regional plan development.[13] Although regionally led, resulting plans must support implementation of national policy and final versions are subject to adoption by Scottish Ministers.[14]

The SSMEI scheme launched in 2006 included 'pilot projects' in the Clyde and Shetland islands, leading to the non-statutory Firth of Clyde Marine Spatial Plan (2010) and subsequent iterations of the Shetland Islands Marine Spatial Plan (SIMSP; with the Fourth Edition published in 2015[15]) and associated reviews (Kelly et al. 2014).[16] MPPs have been established in the Clyde and the Shetland Islands Marine

[4] http://msp.ioc-unesco.org/world-applications/status_of_msp/
[5] https://www.gov.scot/publications/scotlands-national-marine-plan/
[6] Marine Scotland is a civil service directorate within the Scottish Government responsible for the integrated management of Scotland's seas.
[7] https://www2.gov.scot/Topics/marine/seamanagement/regional
[8] https://www2.gov.scot/Topics/marine/Licensing/marine/activities
[9] Marine (Scotland) Act 2010, s 15
[10] Islands (Scotland) Act 2018, s 27
[11] https://www2.gov.scot/Topics/marine/seamanagement/regional/partnerships
[12] https://www.gov.uk/government/collections/marine-planning-in-england
[13] http://msp.ioc-unesco.org/world-applications/europe/iceland/
[14] The highest level of government in Scotland
[15] https://www.shetland.gov.uk/planning/documents/SIMSP_2015.pdf
[16] A Pentland Firth and Orkney Waters Marine Spatial Plan was also produced in 2016 but a Marine Planning Partnership has not yet been established.

Regions, where each have delivered a Regional Assessment (as required by the Act) and are developing their statutory regional marine plans. Once adopted, the Act requires monitoring of marine plans with a report on progress at least every 5 years, at which point Scottish Ministers will decide whether plans will be amended or replaced.[17] Beyond plan development, MPPs also act as statutory consultees on marine licence applications[18] under the Marine Licencing (Consultees) (Scotland) Order 2011.

The Clyde Marine Region, in south-west Scotland, is complex with a diverse coastline of sea lochs and islands and extends inland towards the large port city of Glasgow. It constitutes a sea area of approximately 4000 km^2, is bordered by eight local authority regions and hosts a diverse range of interests, and the Clyde MPP is comprised of 24 members. In contrast, the Shetland Islands Marine Region comprises an archipelago of islands surrounded by an extensive sea area of over 12,305 km^2 and a total population of around 24,000.[19] The Shetland Islands MPP is comprised of 2 members, the NAFC Marine Centre, University of the Highlands and Islands (NAFC UHI) and the Shetland Islands Council, and at the time of study was supported by a stakeholder Advisory Group of 20 members.

Methods

An intensive qualitative case study approach was taken (Yin 2014) investigating the marine planning system of Scotland through two embedded cases of the Clyde and Shetland Marine Regions. The cases were selected for analysis as the only regions where MPPs were established and active and as an opportunity to explore two contrasting situations. Sixteen semi-structured interviews of members of the MPPs (and Advisory Group) of Shetland and the Clyde were undertaken in December 2018 and February 2019, respectively. Timing of interviews coincided with the finalization of the first draft of the Shetland Isles Draft Regional Marine Plan 2019,[20] and the issuing of a 'pre-consultation draft' Clyde Regional Marine Plan.[21] Interviews lasting approximately 1 hour were recorded and transcripts were analysed using NVivo 11, with coding derived from the analytical framework. Interviewees included 8 representatives of the Shetland MPP and Advisory Group and 8 members of the Clyde MPP. These were recruited to cover a range of representative sectors and interests with 5 representing industry (fishing, aquaculture and port operations), 2 representing recreation, 6 public bodies and 3 ENGO representatives. Quotes are anonymised, and 'C' or 'S' denotes the marine region within which the participant is active. Documentary analysis of legislation, policy documents, consultation responses and publically available MPP meeting minutes was also undertaken to support the analysis.

[17] Marine (Scotland) Act 2010, s 16(c)

[18] A marine licence is required for certain activities at sea and are issued by the Marine Scotland Licensing Operations Team (MS LOT) under the Marine (Scotland) Act 2010.

[19] https://www.nafc.uhi.ac.uk/research/marine-spatial-planning/shetland-islands-regional-marine-planning-partnership/sirmp-2019/

[20] https://www.nafc.uhi.ac.uk/research/marine-spatial-planning/shetland-islands-regional-marine-planning-partnership/sirmp-2019/

[21] https://www.clydemarineplan.scot/marine-planning/consultations/

Results

A synthesis of results of the analysis in relation to the four dimensions of adaptive governance is presented, with subthemes which emerged.

Local governance, power-sharing and integration across levels

Is there a perception of greater power at the regional level through marine planning?

Addressing the influence of RMP on local ownership and decision-making (as described by Marine Scotland) participants raised: (a) the role of marine planning in influencing licensable marine activities in the region; (b) the on-going role of the MPPs as statutory consultees (for licenced activities); (c) the influence on wider regional issues beyond licenced activities; and (e) other mechanisms for enhancing local governance of marine resource use. Views addressing the question regarding interaction between national and regional levels are subsequently presented.

Role of RMP in influencing licensable marine activities

In Shetland, marine planning was described as increasing accountability of developers and local authorities: "at least if you have a plan, it's got everything in it, you can hold developers to account and question decisions on applications"(S) and as giving the fishing industry new "established written legitimacy"(S) since their activities are now documented. Participants considered that marine planning has influenced siting of aquaculture proposals in relation to fishing interests, and that it provides a foundation for addressing 'social licence' and issues related to public acceptance of the expansion of aquaculture faced in the region and across Scotland (Billing 2018). Higher quality data and a more detailed understanding of social-ecological interactions at regional scale also contributes to improved national planning which affect the Shetland region such as sectoral planning for renewable energy. The Fourth edition of the SIMSP produced in 2015 was adopted as Supplementary Guidance to local development planning and hence given legal weight prior to the introduction of the formal RMP process, and adoption of the new

regional marine plan is anticipated to further influence development in the region.

In the Clyde, marine planning is at an earlier stage and the draft plan was described as a significant step forward in understanding regional issues. However it was widely considered that the 'strength' of region-specific policies set out in the draft plan was low, with a number of participants considering them to be "high level"(C); largely re-articulating strategic policy and existing legislative requirements with limited further regional direction. Some considered that regional policies could be more ambitious and spatially specific, including identifying areas for recreation and tourism, and providing stronger "direction of travel"(C) for development of non-licensable activities, although there was notably also resistance to placing new spatial constraints on development.[22] A lack of specificity in national policy was considered a problem in guiding policy development in both regions, being general in some cases, or "…in broadly rhetorical terms that no one could possibly disagree with"(S). In the Clyde, participants also cited the large number of interests, competing uses and existing tensions as constraining consensus beyond the generic in development of policies.

Public bodies anticipated that later iterations of the plan might become more prescriptive, but others were concerned that if definitive outcomes of marine planning were not evident in the short term stakeholder commitment could decrease. Concerns of potential "downscaling"(S) of RMP activity due to uncertain funding after plan adoption also raised questions among participants in both the Clyde and Shetland regarding the future influence of RMP. In considering the role of RMP in decision-making an actor in each region was resistant to additional bureaucracy and "adding another layer of complexity into something that is already quite difficult to manage"(S).

The Marine Planning Partnerships as statutory consultees

As a further potential mechanism of influence beyond the content of the plans, the new MPPs are statutory consultees on marine licence applications meaning that the partnership must be consulted on planning applications for proposed licenseable activities in the region and can provide advice to respective consenting authorities in relation to the plan. How this would function was unclear to most and in the Clyde, participants identified potential difficulties in reaching a collective view across a large MPP with different and sometimes conflicting perspectives. Most participants considered that consultation advice provided by the MPPs would become an indication of alignment with the plan only[23]: "My view of that is all the CMPP should do is say is this application consistent or not with the plan; "yes" or "no""(C). Capacity to provide consultation responses was also a concern particularly for complex developments requiring multiple consents and since organizations would represent their own interests in separate consultation responses. Details on how the CMPP will function in its role as statutory consultee are anticipated.[24]

Regional influence beyond licencing and management

Participants considered that RMP could support addressing other issues beyond licensing decisions, including social or ecological concerns such as marine litter and invasive species: "…[RMP] brings management actions as well as the licensing side of things, and so there are significant areas in which the plan can support improvements"(C). Detailing these as wider policies in the plan, or in associated 'Action Plans', could present a basis for these to be considered by regional stakeholders, including future action: "We do need this overarching plan in place before we can start going down into the 'nitty gritty'"(S). However, there are concerns about whether RMP can, or should, seek to influence issues not subject to the licencing process and establishing its role in this regard is on-going, with recent feedback on the Clyde draft plan from Marine Scotland outlining that such policies are "…outwith the scope of the Clyde Regional Marine Plan (CRMP) because (1) they cannot be enforced or monitored and (2) they are outside the scope of the Marine (Scotland) Act 2010."[25] While providing a useful framework for considering a wide range of regional and local issues beyond licenced activities, there is therefore some lack of clarity regarding the scope of marine planning in addressing them.

Other mechanisms for enhancing local governance

Other legislative and policy changes emerged through discussion as relevant to enhancing local governance in coastal and marine resources. In Shetland, a strong maritime history and existing devolution of planning powers under the Zetland County Council Act 1974 means that there is already significant local control and regulation of marine developments. Other established processes of self-organization were referred to as being influential locally, including the voluntary

[22] "…sectoral stakeholders are not interested in spatial policy yet", https://www.clydemarineplan.scot/wp-content/uploads/2020/01/Minutes-3-December-2019.pdf, p. 4

[23] An ENGO commented that: "It is conceivable that if it keeps going the way it is that the plan can exist and not really change anything, and that would be a completely wasted opportunity […] is it going to actually change the way we manage the Clyde? […] All we are ever going to be able to say is, this does or does not seem to comply with or fit with the policies in the plan, it does not seem to me that's adding an awful lot to decision-making at all." (C)

[24] https://www.clydemarineplan.scot/wp-content/uploads/2018/12/Minutes-19-November-2018.pdf

[25] https://www.clydemarineplan.scot/wp-content/uploads/2020/01/Minutes-3-December-2019.pdf, p. 3

management of shellfisheries out to 6 nautical miles through the Shetland Shellfish Management Organisation (SSMO). The Shetland Partnership community planning was referred to as potentially relevant to marine planning in the region since it places a central emphasis on integration, participation and collective visioning for the island.[26]

Participants referred to developments in national public policy in Scotland which emphasize localization, including new primary legislation and opportunities for changing models of local ownership and management. The devolution of the Crown Estate in Scotland[27] and the recently adopted Scottish Crown Estate Act 2019 with associated Local Asset Management Pilot Scheme[28] were considered of potentially greater relevance particularly since this includes some transfer of property management rights: "I would have thought that the work with devolution of the management of the Crown Estate assets probably gives more local control [than RMP]"(C). In the third Scottish Marine Region to due to develop RMP it is intended to establish the Orkney Islands Marine Planning Partnership through this Scheme, to better align planning and management rights, maximizing local control and accountability for marine developments in the region. Additionally, in Shetland, a Sullom Voe Master Plan[29] is being progressed under the Local Asset Management Pilot Scheme to develop planning guidance for a newly opened area around the Sullom Voe Oil Terminal, and is building on the RMP process. A planning authority in the Clyde also referred to the adoption of the Planning (Scotland) Act 2019 as emphasizing greater community empowerment, more flexible planning approaches and will require their role to change significantly.

In Orkney, Shetland and the Western Isles, there are increasing opportunities for self-governance since the adoption of the Islands (Scotland) Act 2018, which includes legal provisions requiring government to 'island-proof' national policy and legislation and enables local deviation from national approaches as appropriate. More broadly, exiting the EU has wide and uncertain implications for national governance, including marine management. Establishing new control of fisheries management for Scotland is of major importance, as also raised in Shetland where fishing is a significant economic contributor. These multiple and overlapping opportunities for local influence complicated understanding the contribution of RMP to local governance, although convening stakeholders in RMP was indicated by one participant as providing a basis to address other opportunities.

How do devolved arrangements through marine planning interact with other levels?

National government was identified as playing an important role in providing resources to MPPs (funding and extensive data resources), guidance and oversight to ensure coherence with national policy and legislative frameworks. An industry participant in the Clyde also considered that government provided neutrality and fairness which to them is compromised within the MPP. They also play an important role in responding to issues extending beyond the boundaries of marine planning, such as large scale fisheries management and climate change, and in representing regional marine interests at national and international scale.

However, difficulties were observed in determining the interaction of marine planning with other governance arrangements, including between national government and the regions: "Throughout the process we come up against national versus local […] We're constantly trying to find out where regional planning fits within the landscape that is already there, and also the changing landscape"(C). In Shetland, the MPP was described as a "regional version of central government"(S); a "top-down" approach, 'owned' centrally, particularly since final plans must be reviewed and approved prior to adoption by Scottish Ministers. Some described a limited role for government as appropriate; "…they don't want to be seen to be involved too much in directing"(C) and; "…there's no prescribed way in saying this is how you do things, in fact the less of that the better"(S). To others in the Clyde, the government was not sufficiently involved at regional scale during plan development and should be more accountable for RMP ("… it does feel to me quite often but they are just absolved of responsibility in this process"(C)). Late government involvement in Clyde marine planning was seen by ENGOs as 'diluting' attempts to be locally specific and constraining efforts to improve regional governance, with guidance needed earlier in the process. In Shetland, government action towards further sectoral planning for offshore wind development surprised the fishing industry and suggested a lack of co-ordination between sectoral and regional planning. Lastly, uncertainty regarding sustained resourcing by government beyond publication of regional plans meant that the future of the RMP process was unclear to all participants. On-going challenges are thus evident in establishing the integration beween national and regional levels in the developing marine planning process.

[26] https://www.shetland.gov.uk/communityplanning/ShetlandPartnership.asp

[27] Following the 2014 referendum on independence for Scotland, the Scotland Act 2016 made provision for the devolution for the management and revenues of Crown Estate assets in Scotland, and the formation of Crown Estate Scotland. Crown Estate Scotland is a public corporation of the Scottish Government which manages a range of rural, coastal and marine assets on behalf of the Crown.

[28] https://www.crownestatescotland.com/what-we-do/local-pilot-scheme

[29] https://www.nafc.uhi.ac.uk/research/marine-spatial-planning/sullom-voe-master-plan-project/

Participation and collaboration

Do marine planning arrangements support greater participation and collaboration?

Results here relate to engagement of participants in the marine planning process and the extent to which it has influenced interactions with others. Key sub-themes which arose were (a) general participation and influence on interactions between actors, (b) specific support for collaboration between actors, and (c) the engagement of civil society in RMP.

Participation and interactions

In addition to compilation of data and information at regional scale, a key benefit of the marine planning process was regarded as the participation and engagement of a wide range of stakeholders through the partnership approach. In both regions, a non-governmental lead and greater involvement of stakeholders in developing marine planning was welcomed. Regional actors lead in shaping the process and developing the content of the plans including regional policies. In Shetland, it was consequently felt that the plan was not imposed on industry: "We were closely involved with drafting [the plan] with other stakeholders and everybody else in Shetland […] it wasn't a plan that came down from on high"(S). An industry participant in the Clyde indicated that the partnership approach was more effective compared to their experience of marine planning in England, where marine plans are developed at regional scale but led by a central authority.

This approach has supported learning regarding other perspectives and building of trust between organizations: "The greatest value of marine planning process is not the production of the plan, it's the discussion that goes on in developing the plan…"(C), and "…it's definitely been about networking and building closer relationships with other people, including people that might have been seen as our competitors"(C). Trust-building was also notable in Shetland where plan development was reported to have supported conflict avoidance by enabling developers to explore appropriate siting of activities such as aquaculture in relation to fishing activity.

Many relationships between regional stakeholders were already established through the SSMEI and regional groups which were pre-cursors to the MPPs, however, RMP has provided a structural and legal imperative for stakeholders to participate and has led to enhanced commitment. Participants provided similar articulations of the broad purpose of marine planning and were in collective agreement on the high level vision of sustainable development for the regions. Engaging in the formative stages of marine planning was particularly important, to support the process (as identified in the Clyde where planning authorities provided useful expertise) and ensure representation of organisational interests. The level of involvement of stakeholders in attending and contributing to the MPPs thus far is significant, according to participants and meeting records.

While encouraging constructive interaction between stakeholders, participation and collaboration differed across the regions. In Shetland, good co-operation is evident and largely ascribed to its island situation which is smaller scale, administered by a single local authority and with fewer perceived conflicts: "…it's easier in an island group where I wouldn't say we are one big happy family but it is one community and there is a sense that if a compromise is possible, let's talk, and framework of the plan allows that to happen. I guess it's bound to happen, we're stuck out in the middle of nowhere, we kind of hang together. And it's hard to see that would be replicated anywhere else"(S). Difficulties were observed in the more complex region of the Clyde where the functioning of the MPP was considered challenged by the large number of actors and some with diverging interests. Consequently, while involvement of stakeholders in partnership activities is high, much time in meetings is spent on defending individual member interests which limits constructive and creative thinking, as commonly reported by different actors: "…in an area like the Clyde, you've got lots of single issue groups who want to say things and influence things but who are not necessarily prepared to get into the business of working together to produce the plan"(C); "The problem with having a wide range of members is it's difficult to get agreement on things and move forward"(C), and; "It's much more adversarial here rather than collaborative"(C). Concern was raised by an industry representative in the Clyde that the group is biased towards environmental interests given their representation in the partnership, while a public authority observed that the leadership ensured a balanced and fair approach. An industry representative and the ENGOs indicated the importance of continuing to engage nationally, directly representing their interests to government to address their concerns in the region.

Sustained participation in the Clyde MPP beyond publication of the plan was considered problematic to some given increasing capacity constraints on members and uncertainty regarding the benefits of the process. The risk of "loss of momentum"(C) was noted as motivation to engage declines if practical outcomes are not forthcoming, a perspective echoed in Shetland: "Well yes, it's the practical application, and if it doesn't seem to have practical relevance then people will stop engaging with it"(S). Consequently, active participation may become biased in favour of those with resources to act and exert influence, when others may lack time, funding or technical capacity, as articulated by an ENGO representative: "The structure then becomes just who can resource it, who can be part of the partnership, who can afford that time, you don't necessarily have a well-balanced partnership"(C).

Collaboration

Collaborative action has been facilitated by the marine planning process and may contribute to addressing local issues identified during plan development even if beyond the legal scope of RMP. This includes early stage "spin-off"(C) partnerships, including between scientists and an ENGO for gathering data at a local scale on cetaceans through community engagement. In the Clyde, RMP has supported co-operation between industry and an ENGO on vessel-based collection of cetacean data, collaboration led by industry to develop ideas for the re-use of dredging material and between industry and Scottish Government on marine litter: "Particularly the marine litter side of things was borne out of relationships that we've had through the partnership…it's given extra impetus to move forward…"(C).

Participation of civil society

Each MPP has prepared a Statement of Public Participation as required by the Act, detailing opportunities for engagement in marine plan development. Groups representing community interests are included as members of the MPP (in the Clyde) or MPP Advisory Group (in Shetland) and targeted engagement exercises seek to ensure the input of citizens. Civil society engagement in marine planning is influenced by local context: in the Clyde, there are challenges in defining representative 'communities' across eight local authority areas and a large associated population.[30] The CMPP have made significant efforts in public engagement, through past projects working with communities, extensive regional workshops and have employed a Public Engagement Officer. Shetland provides a geographically distinct and easier 'community' to define and accessed via 11 strongly functioning community councils, in addition to direct engagement of members of the public, fishermen and recreational users. As a small place, MPP members and stakeholders in Shetland also consider themselves representatives of the community: "…we're such a small place, we are always members of the community anyway"(S). The ENGOs were described as playing an increasing role in public engagement in Shetland, providing further evidence that traditional roles of some ENGOs are changing, in recognition of the interaction between environment and society in sustainable development, and can support public participation in marine planning in certain contexts (Brooker et al. 2019). A number of participants described marine planning as too technical and difficult for the public (and even for themselves) to engage with, and that involvement of experts was important.

[30] Representative quote: "As a planner with years of experience [in the Clyde], it is very difficult to meaningfully involve the community in the planning process"(C)

Learning, innovation and adaptability

What is the capacity for learning and innovation?

Addressing the questions regarding learning enabled by marine planning, responses are themed in relation to (a) the learning-based approach to marine planning in Scotland, (b) the formal review processes, and (c) social learning among actors.

RMP as a learning-based process

It was acknowledged across the regions that they are still 'feeling our way a little bit'(C) and a 'learn by doing' attitude prevails, as they address new requirements with no precedent. Significant effort is underway at the regional scale, and there has been innovation at local scale in both Shetland and the Clyde, notably obtaining alternative financing for regional initiatives to advance marine planning, demonstrating agility in responding to opportunities and deploying resources rapidly. In the Clyde, this included using innovative tools to engage school pupils in developing a vision for the region[31] and engaging communities through a new public dialogue process (Phillips et al. 2018). Nationally, learning is transferred between regions in developing marine planning and is supported through proactive interaction between regional marine planning counterparts and across national organizations involved in multiple regions. However, while there is flexibility in regional approaches, too much diversity or deviation from national standards in marine planning approaches was perceived as a potential concern in influencing regional investment: 'You don't want to jeopardize your own region against someone else's region'(C).

Formal review of regional marine planning

Participants acknowledged the need for marine planning to adapt in the future, to respond to changes in national policy, climate change and technological developments and to consider new social and ecological data: 'it has to adapt according to need and to change'(S). The Act requires review of regional plans at least every 5 years but effort is currently on the development of plans and participants were unclear on how this would proceed: 'We are not entirely sure what that will involve because we have not been directed by government on what they anticipate that review involving'(C). It was suggested that review processes will focus on the baseline assessment undertaken to inform regional marine planning and indicators relating to policies set out within the plan. However, evaluation of progress in a particular direction was perceived as being difficult where policies are general and without

[31] https://www.clydemarineplan.scot/marine-planning/clyde-regional-marine-plan/clyde-schools-engagement-final-report/

measurable objectives. Others raised concerns that the timing and frequency of review may not enable response to interim social or ecological changes. The relationship of RMP review to the Scottish Governments' review of the National Marine Plan and other national cycles is also unclear, and resources were a major concern in the on-going evaluation of RMP.

Social learning

The MPPs provide a locus for interaction and 'provides a framework that guides your thinking'(S). Learning is apparent among actors involved in both regions as they adjust to operating as part of the newly established MPPs and contributes to learning and awareness raising of regional marine issues: 'I've learnt so much from just being able to sit around the table and I suppose try to understand what other people's interests are'(S).[32] Social learning occurs through development of experience and learning at individual and organizational scale (Wyborn 2015) and will continue during the iterative planning cycles based on on-going engagement of regional actors. Results indicate that greater reflexivity to consider how marine planning is functioning in addressing broader governance challenges would be valuable in promoting learning and developing collective understanding of RMP.[33] Including reflections of wider members of the partnership in the Clyde in reports to government in particular would be welcomed: "other partnerships I'm involved in...you would carry out regular reviews on how the partnership is feeling, how it's working, what stakeholders think needs to change…"(C).

Is there adaptability to respond to change through marine planning?

RMP is enabling design of policies and process shaped by regional conditions and which will be amended through future iterations of planning. However, decisions on marine development are still taken (and challenged) through existing regulatory frameworks which were considered slow to change. To an industry representative, a pace of change through "small steps" (C) is dictated by existing legislation and is appropriate: "People need time to work out the right decision at the right level and the right changes at the right level… it's always a case of saying how can we try and recognise what we can get out of this in terms of legislation without going too far so that you expose yourself to challenge" (C). However, a public authority in Shetland and ENGOs in the Clyde expressed frustration at a perceived lack of possibility for change through RMP, for example: "You created a structure that allows nothing to happen, no changes to be made actually. So that's why […] we have to fight so hard for any plan to be radical and to make a difference" (C). Others agreed that the governance system within which RMP is embedded is slow to respond, for example where regulation is "constraining what we're doing" and needs to "catch up"(S) with development, but that focus should be on problems in existing management frameworks and "challenge what's not working within the existing system" rather than "wholesale change"(S).

A need to collectively develop understanding of what marine planning should achieve over the long-term was expressed across actor groups, including in relation to the wider governance system, to support adapting in the future: "Nobody sits down and says 'Does anyone have any idea about where we should be going?' And you kind of take it that there is a plan"(S); "I still think after all these years of talking about what we're trying to develop, I don't think people have got a fully formed idea about what [marine planning] is"(S); and "Without guidance on what a regional plan is supposed to be doing from government, which we don't have, then it's difficult to know how they are expecting the regional plans to make a huge difference"(C). In the Clyde, members have collecively agreed that future plan development should focus on "1—what is the strength of the Plan? and 2—how good is the Plan at doing what it is supposed to be doing?" to support on-going improvement and adaptation.[34]

Self-organizing and supporting activities

What self-organizing activities are evident in relation to RMP?

Self-organization and co-operation is present in both regions, between individuals and organizations, influenced by existing context and behaviour. Such action, particularly leadership, is essential in the implementation of RMP and in adaptive governance. It has developed in response to the opportunity provided through marine planning, from pilots to the statutory process. Collaborative action identified above as supported through the marine planning process are self-organizing, since actions are voluntary and proactive, responding collectively with shared responsibilities. Other activity pre-dates marine planning in the regions and provides a supporting context, including existing voluntary management measures such as those developed through the partnership-based SSMO and interactions supported by the Firth of Clyde Forum which led on pilot planning in the Clyde.

Building on an existing forum was problematic to some in the Clyde as it allows existing tensions to influence MPP functioning and contributes to confusion on the fundamentally different remit of the new MPP. Coalition-building to

[32] *There's a better understanding on all sides I think because of this process.*

[33] *I never get the opportunity to talk at this kind of strategic out of the box level…and actually these things are really, really important but they are just pushed aside all the time by the day-to-day stuff because we have no staff and no resources.*

[34] https://www.clydemarineplan.scot/wp-content/uploads/2019/02/Minutes-31-January-2019-A2875959.pdf

form an environmental "bloc"(C) was observed by a number of participants, including the ENGOs themselves, in order to "maintain the levels of scrutiny and rigour we have done with other systems and processes in the past"(C). Such co-operation among CMPP members represents a 'shadow network' and enables collaboration with influence at different levels (Olsson 2006). While intended to promote better planning in the Clyde (according to environmental interests) concerns were raised by an industry representative that this compromised the democratic functioning of the CMPP.

Leadership is critically important in facilitating interactive processes and the delegated regional organizations were considered as providing valuable leadership in Shetland and the Clyde. Their commitment to the development of a new process which facilitates broad input at regional scale was noted, including by a planning authority: "I do think they do quite a good job of listening to everyone and managing to tease out the consensus and they do the best they can, given the challenges".(C). Other proactive individuals were described as particularly influential in the development of marine planning, including those embedded within different organizations.

Discussion

Does regional marine planning enable adaptive governance?

Marine planning in Scotland has been theorized here as a process that is embedded in a social democratic society operating according to a 'rule of law' (Habermas 1996). Based on this, we set out to understand whether the dimensions of adaptive governance, as described in the literature, are 'embodied' or enabled through the developing marine planning process in Scotland, to better understand the contribution of marine planning to governance of marine resources. Our findings show mixed results in this regard.

Marine planning is being implemented through a regional and learning-based approach intended to enhance local ownership and decision-making, where enabling legislation has created the legal preconditions for the establishment of the MPPs and empowered them to develop a regional marine plan. In Shetland and the Clyde, the MPPs are innovating in marine planning practice, with little precedent and limited resources. Approaches are shaped by proactive and self-organizing actors who lead and advance marine planning practice, translating learning between regions through formal and informal networks. Participation and self-organization is high, particularly considering resource and capacity constraints. The process is enabled by leadership of the MPPs who aim to advance marine planning (including by mobilizing funding) and support consensus-building through collective policy making. Further, the RMP process is supporting collaborative activity and initiatives addressing local and regional issues, demonstrating self-organization and adaptive governance beyond the formal scope of marine planning. It thus suggests a model of marine planning described by Craig (2019) as supportive of adaptive governance: a mandated participatory forum supporting polycentric and creative processes based on learning and increased collaboration.

The influence of context is evident and the MPPs vary in character and functioning in each marine region. Findings suggest that socio-cultural and governance arrangements in certain island contexts better enable a sense of local ownership and enhance legitimacy and accountability through marine planning. The drive for local control of decision-making and a more cohesive and community-based stakeholder group found in Shetland indicates social capital (including trust and social networks) and resilience (Folke et al. 2005) which is less easily replicated in mainland regions. This provides a stronger basis for adaptive governance where participants in marine planning seek to "integrate their interests into policy that advances their common interest" (Brunner 2010: 304). The more complex governance landscape of the Clyde, with multiple local authorities and diverse and sometimes competing stakeholder interests, presents challenges and a different context for adaptive governance through marine planning. Here, regional marine planning provides a better scale for understanding regional issues and is supporting learning and collaborative action, but representation of single interests dominates and tensions between actors limit consensus on policies which meaningfully influence regional development. Increasing local ownership is less tractable here, and difficulties in engaging a 'local' community in a large and populous region are evident. Variability across regions could be considered in institutional design for collaborative marine planning in other regions, in Scotland and elsewhere.[35]

Adaptive governance implies not just collaborative processes and multi-level arrangements but that these are consequential in terms of the ability to shape governance responses at the local scale. It should enable diverse stakeholders to pool their knowledge and resources to solve shared environmental or natural resource dilemmas based on learning and experience (Djalante et al. 2011). While the marine planning process can be seen to provide structural and procedural adaptive capacity which supports adaptive governance (Craig 2019) the extent to which this enables better governance outcomes depends on the influence of marine planning on decision-making and human activities in the regions. This study reveals challenges in this regard, particularly in relation to (1) the vertical interaction between regional and national authority

[35] For space, discussion of the governance structure of individual MPPs has not been included here but is also relevant to the functioning of the MPPs.

in multi-level marine planning arrangements; (2) the adaptive capacity of prevailing legislative regimes, and (3) enabling adaptive governance over the long-term, beyond publication of marine plans. These reflect key tensions which are characteristic of institutionalizing adaptive governance and are discussed below with recommendations which emerge. These are relevant to understanding the potential for enabling adaptive governance through marine planning in Scotland and in other jurisdictions.

Challenges in marine planning include ensuring the fair and inclusive participation of stakeholders in debating arenas (Flannery et al. 2018) and resisting undue influence from economic power exerted from outwith Scotland by global markets and what some authors identify as 'neoliberal hegemony' (Smith and Jentoft 2017; Tafon 2018). While important topics, this study focusses on the governance system, including the institutional arrangements which determine the functioning of marine planning, and such power is considered exogenous in this case, i.e. an aspect of the *social, economic and political setting* (as defined in McGinnis 2011), beyond control of marine planning and is not addressed further here. However, insights into the participatory arrangements in marine planning are reported and connections to this wider debate indicated.

Interplay between central and decentralized authority in multi-level marine planning arrangements

An adaptive governance perspective has brought focus on marine planning in Scotland as an emerging interface between 'top-down' government authority and collaborative governance based on empowerment of regional actors. Nested planning arrangements support its implementation as also found in community-based marine planning in British Columbia, Canada (Diggon et al. 2019). Central government plays an important role in providing legal and economic legitimacy for the development of statutory marine plans, as well as technical resources and oversight to ensure coherence with national policy and legislative frameworks. However, polycentric self-organization and adaptive governance within extant regimes with central authority is difficult (De Caro et al. 2017) and vertical linkages between local-level institutions and sub-national or national ones are often characterized by tensions (Newig and Fritsch 2009). In Scotland, determining the interplay between the regional MPPs and national government is on-going, but questions are raised regarding the extent to which MPPs are empowered to influence activities within their regions.

While a regional approach, legal arrangements define a prevailing 'top-down' process and results indicate a widely held perception that this remains the case. MPPs are legally required to implement *national* policy, but interpreting national policy, including policy which is relatively non-specific, is difficult and there is limited guidance for the MPPs. Further, marine planning policies which make new demands beyond existing legislative requirements, for example in relation to 'non-planning' issues such as marine litter, are necessarily indicative, using less binding terminology and are harder to enforce. It is not yet clear whether such policies can be included in the final statutory plans due to risk of legal challenge and, at the time of writing, the CMPP are yet to reach agreement with Marine Scotland (and across the partnership) on what it is appropriate to include within the plan.[36] Defining influential regional marine plans which demonstrably shape regional marine use within this national framing and on-going uncertainty is challenging for the MPPs. In adaptive governance terms, devolution of management rights and power-sharing between levels that promotes participation (Folke et al. 2005) can only be considered partial in regional marine planning, within these national constraints.

Further, the responsibility of national government for ensuring effective delivery of the regional marine planning process in these nested arrangements is uncertain and developing reactively as the process evolves. Some flexibility is beneficial and allows vertical interplay to vary in each region, according to existing governance arrangements and social characteristics. In Shetland (and the other island regions of Orkney and the Western Isles), self-governance at island scale is desirable and marine planning is well advanced, and there is less emphasis placed on the need for a strong role for national government. In the Clyde, however, participants reflected that earlier intervention by government would have been appropriate to avoid a costly and time-consuming process of 'trial and error' in developing marine planning. Greater input from national government was also desired in the Clyde by actors who consider the process to be democratically challenged at regional scale, given the difficulties of balancing multiple and competing interests. Notably, these actors also view engagement at the national level (i.e. with government) as remaining of key importance in advancing their interests and addressing regional concerns, suggestive of underlying power dynamics which affect and potentially undermine attempts at participatory governance in marine planning (Flannery et al. 2018).

Adaptive capacity of existing planning and management regimes

The regional approach to marine planning enables the shaping of rules which reflect local conditions, based on higher quality data and understanding of regional context. However, in addition to vertical integration there is an observed tension between marine planning, which intends to support collaborative, adaptive processes, and the rigidity and lower flexibility

[36] https://www.clydemarineplan.scot/wp-content/uploads/2020/01/Minutes-3-December-2019.pdf

of existing policy, planning and management arrangements. Marine planning is intended to guide licencing and permitting decisions based on statutory consideration of the marine plan by regulatory authorities and activities in the regions remain influenced by a complex system of decision-making at different scales. This includes policy development (e.g. aquaculture policy), development planning (e.g. land-use planning or sectoral planning such as for offshore renewable energy) and the management (including licencing and enforcement) of specific activities by different authorities. The ability of MPPs to consider 'alternative management options' and respond to learning on management choices is very limited in this context and, given that decisions are taken through different regimes, adaptive governance is thus constrained by the prevailing planning and management frameworks which marine planning seeks to influence.

The challenge of integrating adaptive approaches into highly regulated systems posed by existing formal institutions and the rule of law is well documented (Chaffin et al. 2014; Camacho and Glicksman 2016; Cosens et al. 2017). Conventional institutional responses, including strictly enforced regulations, are still needed (Armitage et al. 2009; Pierre and Peters 2005) and adaptive governance requires balancing stability in governance with flexibility adapt to changing circumstances and emerging knowledge (legal adaptive capacity) (Soininen and Platjouw 2018). Identifying this tension in marine planning to achieve adaptive governance has two implications: firstly, it underlines the need to better understand the interaction between marine planning and other management (the extent to which it can influence decision-making in other domains), and secondly, in addressing governance deficiencies, attention is also required on the adaptive capacity of existing legislative frameworks which govern licencing and decision-making of activities at sea. Craig (2019) goes further to suggest the need for procedural reform in marine planning in the US, to legally connect permitting processes, marine planning and adaptive management to enable flexibility and adaptive governance institutions to emerge.

Overlaying marine planning on existing processes also contributes to confusion among stakeholders regarding the relationship between marine planning and other planning and decision-making mechanisms in Scotland (Smith and Jentoft 2017). This is evident and clarity on the interaction of marine planning with other planning and management processes would support stakeholder understanding and expectations of the role of RMP. This may develop as marine planning proceeds, for example the intention of greater future co-operation between MPPs and the Regional Inshore Fisheries Groups in planning and management of fisheries in the regions.[37]

[37] https://www.sift-uk.org/wp-content/uploads/2019/03/RIFGs-Policy-Practice-and-Problems-SIFT-2018.pdf

Negotiating different perceptions and attitudes to change in adaptive governance, and the cognitive biases which may be at work (De Caro et al. 2017), is important in considering adaptive capacity. Here, there were conflicting views between those who consider the inertia of prevailing governance as constraining what is possible through marine planning, including "transformative change"(C), and those who consider it provides predictability, efficiency and a basis for adapting incrementally over time. These underlying differences can undermine proposed changes to environmental governance systems (such as through marine planning) and can amplify the influence of power imbalances on adaptive governance (De Caro et al. 2017).

Adaptive governance beyond the publication of marine plans

Adaptive governance is fundamentally based on incremental improvements supported by knowledge generation developed through the on-going participation of actors in the processes of governance and reflecting on practical experience (Brunner 2010). On-going assessment and reflection is essential to respond to feedback (Armitage et al. 2009). Looking ahead, mechanisms of on-going adaptive improvements beyond plan adoption are limited and uncertain. The formal review process presents a structured opportunity to adapt the marine plans, and the updating of the regional assessments supports understanding the current trajectory of the system to support adaptation (Gunderson et al. 2018). However, this process is still to be defined, and legally, a report is only required every 5 years, which will inform a decision on whether a new plan is required.[38] Further, in evaluating regional marine planning, the Act requires MPPs to assess 'the progress they have made towards the objectives within the *national* marine plan' (S.16, Art.26, emphasis added) rather than in achieving regional objectives. Interim activity initiated through the MPPs, such as collaborative data collection on cetaceans, can continue to develop understanding of issues at regional scale and facilitate on-going interaction between stakeholders, but limited financial and technical capacity constrains the depth and scale of reflection and ability to act, particularly beyond immediate remits or concerns. Infrequent review compromises adaptive processes since the benefits require fostering over a long time (Armitage et al. 2009), yet participants rely on successful interim outcomes to augment resources for the next steps (Brunner 2010). The potential for substantially reduced activity post-plan production raises concerns regarding on-going adaptation to changing context through on-going interactions and learning (Craig 2019).

Adaptive governance promotes evaluation that focusses on institutions and processes in addition to policy outcomes (Olsen et al. 2011), for example the extent to which there are

[38] Marine (Scotland) Act 2010, S.16. Art. 26

multiple interests, perspectives and linkages among organizations, communication and negotiation, and social learning (Armitage et al. 2009). Greater emphasis on the learning process would be beneficial, including reflecting on functioning of RMP when defining the parameters of the monitoring and review process is required, beyond measuring national policy outcomes required by the Act. This could acknowledge and enhance its wider contribution, including data collation, co-operation and learning between actors and better understanding of the status of the region, respective stakeholder concerns and spatial needs. More structured, frequent and on-going participatory evaluation across the MPPs and wider stakeholder groups was indicated as desirable and may enhance such learning, encourage debate on the purpose of marine planning and capture benefits for stakeholders and planning managers. The need for evaluation of governance performance itself in marine management and not just policy outcomes has been emphasized (Ehler 2003) and increasing accountability and capacity to learn through greater reflexivity of actors on the governance process in marine planning is suggested.

Finally, adaptive governance also depends on the 'scaling up' of learning at the regional level to governance and decision-making at higher scales (Brunner 2010; Garmestani and Benson 2013), to ensure the benefits of learning and experience developed through a bottom-up and adaptive process is transferred into the dominant hierarchical, 'top-down' regime (Brunner 2010). More work is needed to identify how new understanding gained through practical experience through regional marine planning can inform national policy, planning and management approaches. Conceptual frameworks for understanding change, including transition management, could support learning from experimentation in management to support transformations in marine governance (Kelly et al. 2018).

Wider context of reform in marine governance

Marine planning is developing within a wider context of governance reform in Scotland affecting the governance of marine resources and may provide greater opportunity for adaptive governance by enabling changes in management in addition to planning. Recent policy and legislative changes include the potential for new models of locally led, collaborative and learning-based asset management under the Scottish Crown Estate Act 2019, emphasis on community empowerment and flexibility through the Planning (Scotland) Act 2019 and increasing self-governance for islands provided by the Islands Act 2018, among others. Further constitutional change can be expected following the UK's exit from the European Union and a possible second referendum on Scottish independence. Rapidly changing context can provide opportunity for transitions in governance (Gelcich et al. 2010) and might be steered towards adaptive governance (Folke et al. 2005). There is convergence across developing policy and primary legislation in Scotland on dimensions of local governance, participatory and adaptive processes (Greenhill et al. in press), leading to a strengthened legal adaptive capacity based on substantive and procedural provisions for adaptive governance across scales (Cosens et al. 2017). How these mechanisms interact is unclear, but it indicates wider reform towards adaptive governance in Scotland, within which regional marine planning plays a part. As indicated, responding to other emerging opportunities for changing ownership models could be support by the participation and self-organization enabled by the RMP process. On-going reflection on the role of marine planning in this broader context is essential, to understand its relevance as a complementary governance process and to ensure that the learning gained through marine planning is transferred.

Conclusion

Understanding the contribution of marine planning to governance is critical given the investment in its application worldwide and the sustainability challenges it intends to address. In Scotland, over a decade of marine planning experience has informed the implementation of regional marine planning, and the MPPs continue to 'learn by doing' and advance as pioneers of marine planning practice. Attention has been drawn in this study to the way in which marine planning can support features of adaptive governance, including engagement of diverse actors in collective negotiation of policies, learning, trust-building, collaboration and contextualization of management decisions. Two cases provide different examples of how a regional approach is developing, demonstrating intense activity and different experience particularly in relation to the influence of context on partnership-led marine planning.

Addressing the marine planning system more broadly, we observe the complexities and challenges of the emergence and coexistence of sub-national models of marine planning within a hierarchical system, and the implications for adaptive governance. Here, the MPPs are empowered to develop a marine plan, but the 'empowerment' is partial, with overriding decision-making power maintained in existing, 'top-down' governing structures. This may constrain the overall outcomes of the marine planning process and the benefits of adaptive governance gained through its development. Greater power at the regional scale in marine planning is shown to not be necessarily desirable or appropriate and would require much greater focus on democratic functioning at regional scale, but ambiguity in these arrangements contributes to confusion among stakeholders on the purpose, scope and contribution of marine planning, particularly given the increased transaction costs of engaging in its development.

Our analysis also provides insights into RMP as an experimental governance design and an interface between traditional management approaches and adaptive, innovative practice. Resulting tensions are evident and adaptive governance in marine planning to enable responsive, locally influenced management of marine resources is limited by the adaptive capacity of defining legislation and broader management structures. Marine planning has a legal statutory basis to *guide* the development of decision-making rules (and therefore a role in governance) but this is often distinct from *management* authority, which remains predominantly influenced by existing institutions and practice, with lower flexibility for change or reform.

The prevailing rule of law justifies greater focus on the legal adaptive capacity of marine management arrangements to enable flexibility and adaptive governance, as advancing in relation to water governance in the US (e.g. Cosens et al. 2017; Craig 2019), including legislation defining the marine planning process as well as other planning, management and decision-making addressing marine activities. To experiment and consider alternative management options, wider regulatory innovations may be required, including consideration of how law can be reformed or re-interpreted to facilitate adaptive governance (as explored in Craig et al. 2017).

We also bring attention to wider reform changing marine governance, including where greater transfer of ownership and management rights could better support adaptive governance by more closely aligning polycentric governance arrangements with decision-making authority. In Scotland, state-centric governance is evolving towards a more diverse and complex array of public and private arrangements and further constitutional change following the UK's exit from the European Union presents a dynamic situation. New legislative and policy changes, such as changing arrangements under the Islands (Scotland) Act 2018 and the Scottish Crown Estate Act 2019, are indicated here as having potential in this regard. Understanding the legal adaptive capacity of emerging instruments, and of existing mechanisms, is needed to understand the opportunity for adaptive governance and institutional innovation and the contribution of marine planning in this evolving context.

Adaptive governance cannot be mandated but can be supported or enhanced (Folke et al. 2005). Marine planning plays a role as a new institutional arrangement and this analysis has enabled identification of how its contribution can be enhanced, based on (1) clarity in accountability, power and authority between marine planning and overlapping planning and management; (2) demonstrating flexibility in wider management to respond to learning; (3) supporting learning processes and reflexivity among stakeholders; and (4) ensuring sustained funding and capacity for marine planning initiatives.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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