

Changing fish distributions challenge quota allocations: a solution based on zonal attachment

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Changes in fish distribution are being observed across the globe. In Europe's Common Fisheries Policy, the share of the catch (quota) of each fish stock is split among management areas using a fixed allocation key known as 'Relative Stability': in each management area, member states get the same proportion of the total catch each year. That proportion is largely based on catches made by those member states in the 1970s. Baudron *et al.* (2020) provided an overview of changes in distribution for 19 northeast Atlantic fish species encompassing 73 commercial stocks over 30 yrs. All species have experienced changes in distribution, particularly those traditionally occurring in southern waters which have expanded into northern areas.

These changes are not reflected in the allocation of quotas, or catch shares, so conservation objectives are jeopardised, because fishers catch more than is allocated. It could be argued, therefore, the quota shares should correspond to the share of the fish stock biomass present within a country's Exclusive Economic Zone, a concept known as Zonal Attachment.

Here we provide a formal definition of zonal attachment, which accounts for spatial and temporal variability, as well as all life stages of fish, in multiple jurisdictions. We assessed the Zonal Attachment of transboundary fish stocks present in the waters of the United Kingdom around Scotland, the European Union (without the United Kingdom), and Norway. In 12 of 14 important fish stocks, estimates of Zonal Attachment to the United Kingdom were significantly higher than current quota allocations, explaining the country's substantial discard problem (Fernandes and Fallon, 2020). With environmental change, and stock recovery under improved fisheries conservation, scientific evidence should be used not only to set catch limits, but also to re-examine catch shares.

Tweetable abstract

Changes in fish distribution require changes in quota allocations based on zonal attachment.

@PaulFer13180972

Acknowledgements

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Stakeholder Capacity for Ecosystem Based Management in the Loch Sunart to Sound of Jura Marine Protected Area

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I have applied for IMarEST membership.

Twitter abstract:

What capacity (knowledge, enthusiasm, and means) do stakeholders in the Loch Sunart to Sound of Jura MPA have for greater implementation of Ecosystem Based Management? A survey of commercial and non-commercial users of the local marine environment produced intriguing results.

My twitter handle is @peterjph

Full abstract:

This study discusses the principles and benefits of ecosystem based management (EBM), and incorporates a survey assessing stakeholders' capacity (knowledge, enthusiasm, and means) for further implementation of EBM. The Loch Sunart to Sound of Jura MPA was used as a case study because of the large number of commercial, academic and leisure-orientated stakeholders there, and the fact that it is specifically designated to protect just one species (common skate), which means it is not currently managed under an EBM philosophy. A survey of 8 commercial stakeholders and 30 non-commercial stakeholders identified a number of trends and concerns, and led to several recommendations. There was consistently a wide range of opinions about how healthy the MPA is. Even among academic stakeholders there are big differences in opinion about what EBM is and to what extent it is currently implemented. There was a clear trend of those who spend time under the sea thinking the marine environment is less healthy than those who do not, which is evidence that the "out of sight, out of mind" principle still applies even among commercial stakeholders. Across both stakeholder groups there was a recurring concern about the lack of MPA policing, a mistrust of Marine Scotland, and the inability of opposing stakeholder groups (in particular dredgers and less destructive stakeholders) to reach consensus in a regional advisory committee. Key recommendations made include the need to instigate a general public and stakeholder awareness campaign in order to increase knowledge about the state of our marine ecosystems, in particular the seabed; the need to ban dredging and aquaculture inside MPAs to give them validity and as a pre-requisite for effective stakeholder control; and the need to manage MPAs with a more holistic remit than the protection of one or two species.

A grounded theory approach to explore industry views on an adaptive co-management framework for whale-watching tourism in Scotland

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Commercial whale-watching has been the fastest-growing segment of the marine wildlife tourism (MWT) sector [1]. This industry in general can be viewed as a sustainable way to exploit wildlife but can also have multiple detrimental impacts on targeted species.

Sustainable development of marine wildlife tourism (MWT) in hotspot or emerging destinations is not consistently factored into national marine plans and tourism strategies. Improved understanding of the industry's current activities and views on any future changes to MWT management in general provide insights into how national plans and strategies could offer more enabling conditions that balance industry growth with sustainability.

The present study adopted a grounded theory approach to assess the views of Scottish whale-watching operators on existing and future management of their marine wildlife tourism (MWT) activities. Three management scenarios were derived from a literature review of whale-watching practices and regulatory regimes worldwide. Scenarios served as a basis for online surveys and semi-structured interviews to identify emergent concepts, which were subsequently analysed to construct theories about how management could be improved.

Results shed light on the need to be proactive regarding the management of whale-watching in Scotland. Co-management involving operators at every stage of the decision-making process and in developing management strategies would make sure operators' voices are heard, and their needs considered as far as possible, allowing them to share their knowledge and experience. Results suggest that an adaptive and progressive management scheme, integrated with Scottish marine planning, would ensure the whale-watching industry develops within

its environmental limits. It would manage operators' expectations, and find ways to support them through any change that might be deemed necessary to achieve conservation needs. Operators also raised strong concerns about adverse impacts on cetaceans from other recreational users such as those on jet-skis; thus, mitigation in an era marked by Scotland's ambitious marine tourism plan requires us to consider cumulative pressures and how to achieve wider engagement with the public including tourists.

References

[1] Higham, J., & Lück, M. (Eds.). (2007). *Marine wildlife and tourism management: insights from the natural and social sciences*. Wallingford: CABI. <https://doi.org/10.1079/9781845933456.0000>

additional tweetable abstract first (max. 280 characters) to assist online promotion.
#MASTSasm2020:

The growth of Marine wildlife tourism (MWT) in Scotland requires proactive management. Our study assesses the views of Scottish whale-watching operators on existing and future management of their MWT activities to ensure they develop within their environmental limits.

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@FannyRoyanez
@iAtlanticEU
@ScotLINK

Evolution in Ocean Literacy – A Mechanism for Behaviour Change?

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Tweetable Abstract

Can #OceanLiteracy lead to #behaviourchange for the #ocean? #OL has evolved from a 'knowledge deficit' approach, to including awareness, attitude, communication, behaviour & activism. Marine social sciences have been central to this. #MASTSasm2020 #MarSocSci

@darylburdon

@EmmaJMcKinley

Abstract

In the early 2000s, ocean literacy was defined as 'understanding your influence on the ocean, and its influence on you'; however, recent developments have seen the concept begin to evolve. The initial focus of the field took a 'knowledge deficit' approach (i.e. more knowledge would equal more concern and even a behaviour change) and was largely approached from a natural science perspective. However, the last decade has seen a shift in focus, recognising that ocean literacy is much more than 'knowledge' and must also encompass other dimensions such as 'awareness', 'attitude', 'communication', 'behaviour' and 'activism'. In addition, recent years have also seen a growing focus on societal connection with the ocean, and the emotion and empathy that may be harnessed to realise behaviour change.

The majority of ocean literacy related research in the UK has focused on awareness, knowledge and attitudes towards marine issues and climate change (e.g. ocean acidification). However, research into other dimensions of ocean literacy, and how this can be successfully translated in either behaviour or policy change, has been limited (e.g. communication, behaviour and activism). This requires a truly interdisciplinary approach, increasingly driven by marine social science disciplines.

As such, ocean literacy must be considered as being not only about increasing public awareness on the state of the ocean, our impacts upon it and its impacts upon us, but also about providing tools and approaches to transform ocean knowledge into behaviours and actions that promote ocean sustainability. There is also a need to further explore how enhancing ocean literacy at different scales and among different audiences or groups of people can be used to develop more effective ocean policy and management, both for the UK and further afield.

This flash-talk will provide a synthesis of evidence on our current understanding of ocean literacy and ocean climate-related behaviour change in the UK. Taking insight from other related concepts, such as ocean connectedness, marine citizenship and pro-environmental behaviour change, we present evidence from a review of the published and grey literature and an assessment of indicators, datasets and surveys which could be implemented to assess behavioural-change in the UK population.

Acknowledgements

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A new strategic tool to structure Cumulative Impact Assessment (CIA)

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Create a more #Strategic #Environmental #Assessment based on a holistic-pragmatic bottom-up/top-down ecosystem-based approach linking #Climate change oceanic drivers to MRED to spatially-temporally assess #cumulative #impact @UoABioSci@JNCC_UK #MASTSasm2020

@Morgane_Dclrck

To mitigate climate change consequences, the UK government plans to generate 40 GW of offshore wind energy by 2030 with the draft sectoral plan claiming room for up to 100 GW of floating wind just in Scottish waters. The North Sea is a dynamic ecosystem with strong bottom-up/top-down ecological drivers facing rapid climate change impacts (Cox et al., 2018). Therefore, to ensure compatibility of such large-scale developments with nature conservation obligations, cumulative effects need to be assessed (Willstead et al., 2018).

CIA is currently under the authority of both the Strategic Environmental Assessment (SEA) (Directive 2001/42/EC) and the amended Environmental Impact Assessment (Directive 2014/52/EU). The current CIA excludes rapid climate change impacts and thus lacks spatial-temporal appropriate baselines linking ecosystem components (e.g. oceanic drivers) to population dynamics (Bidstrup et al., 2016). This leads to uncertain predictions at colonies and populations levels (Willstead et al., 2018).

We present an overview of a holistic and pragmatic bottom-up/top-down ecosystem-based approach using a spatial-temporal nested Bayesian network.

By linking functional habitat variations to trophic interactions and species trade-offs, this tool will identify pressure pathways, keystone components, ecosystem connectivity and resilience from colonies to populations levels changes.

This transboundary framework would provide a multi-dimensional decision-making tool that would lead towards more strategic SEAs by embedding individual CIA projects in local to multinational schemes and vice versa. We also show how this approach could create transparent guidelines integrating local management, government decision-making and international collaborations to inform meaningful future planning.

Acknowledgements

I would like to thank Prof. Beth Scott, Dr Neda Trifonova, Dr Julie Black and Dr John Hartley for their guidance.

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- Bidstrup, M., Kørnøv, L., & Partidário, M. R. (2016). Cumulative effects in strategic environmental assessment: The influence of plan boundaries. *Environmental Impact Assessment Review*, 57, 151–158.
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Integration analysis over the management of transboundary marine resources

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Abstract

The ocean is an interconnected and essential source for life on Earth, and humans greatly depend on its ecosystems and recognise it as an essential component of economic growth. As a result of this interconnection and the multiplicity of given uses, challenges deriving from the ocean are complex and demand multidisciplinary, the consideration of multiple scales and stakeholders and collective action. In this regard, ocean governance is key. However, the current approach tends to be sectoral and arguably mostly has a silos approach. Therefore, a more holistic model, such as the ecosystem approach (EA), could expand the governance rationale to include the spatial misfit between ecosystem boundaries and the governing system. In this context, the sustainable use of marine resources will depend on the management of areas crossing country boundaries and involving multiple sectors. In this sense, a coherent policy implementation based on the EA needs to consider different levels of power, beyond the national level, with the regional level highlighted as a possible basis for guidance of marine management across borders. This study aims to determine if and how elements in the management of transboundary marine resources are being used to integrate across nation-states and sectors in the North Sea region. This is being addressed by exploring policy developments built upon planning and management of selected transboundary resources at different levels of power in the northern North Sea. In conclusion, this work aims to understand if and how a regional approach can address some of the shortfalls observed in the current ocean governance.

Tweetable Abstract (280 characters)

The regional level is a possible basis for guidance on coherent marine management across borders. Accordingly, this study aims to determine elements in the management of transboundary marine resources used to integrate across nation-states and sectors in the North Sea region.

This template is an example of how to prepare an abstract for the 2020 MASTS Annual Science Meeting, to be held online during the week of **5-9 October 2020**.

Please note that abstracts should be broad and applicable to a wide audience.

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The full abstract should be submitted to masts@st-andrews.ac.uk, in an editable format, by 16:00 Friday 14th August 2020.

Abstract authors who are selected to give a 5-6 minute flash-talk at the ASM will also be asked to provide a 30-60 second pre-recorded video abstract of their talk for promotional purposes.

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A brief paragraph with acknowledgements may be added at the end of the main text.

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References

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MASTS ASM 2020

ABSTRACT SUBMISSION

Session: Governing Scottish Seas: theory, practice and future horizons

Title: Ocean Literacy and the UN Decade of Ocean Science for Sustainable Development (2021 – 2030)

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Full Abstract

Rapid changes are taking place in the ocean. Humans are at the centre of the cause of these changes and must be integral to the solution. The United Nations has taken a strong lead through the Sustainable Development Goals and the UN Decade of Ocean Science for Sustainable Development (2021 – 2030). Within this thinking are seven societal outcomes brigaded under the term 'The ocean we want'. These include:

- I. A clean ocean
- II. A healthy and resilient ocean
- III. A productive ocean
- IV. A predicted ocean
- V. A safe ocean
- VI. An accessible ocean
- VII. An inspiring and engaging ocean

Much of this is reflected in the long-standing vision for Scottish seas. If the necessary changes are to be achieved, then engagement with the 'Decade' will be necessary as will engagement with society. The MASTS community must not only be part of the data and information generating process, but must proactively develop novel and impactful ways of disseminating the information to affect change, including how we manage the human activities impacting on the ocean.

Tweetable Abstract

Rapid changes in the ocean needs to be tackled. People are at the heart of the solution. The message needs to be clear and of international relevance. The UN 'Decade' and the MASTS community will be key in Scotland.