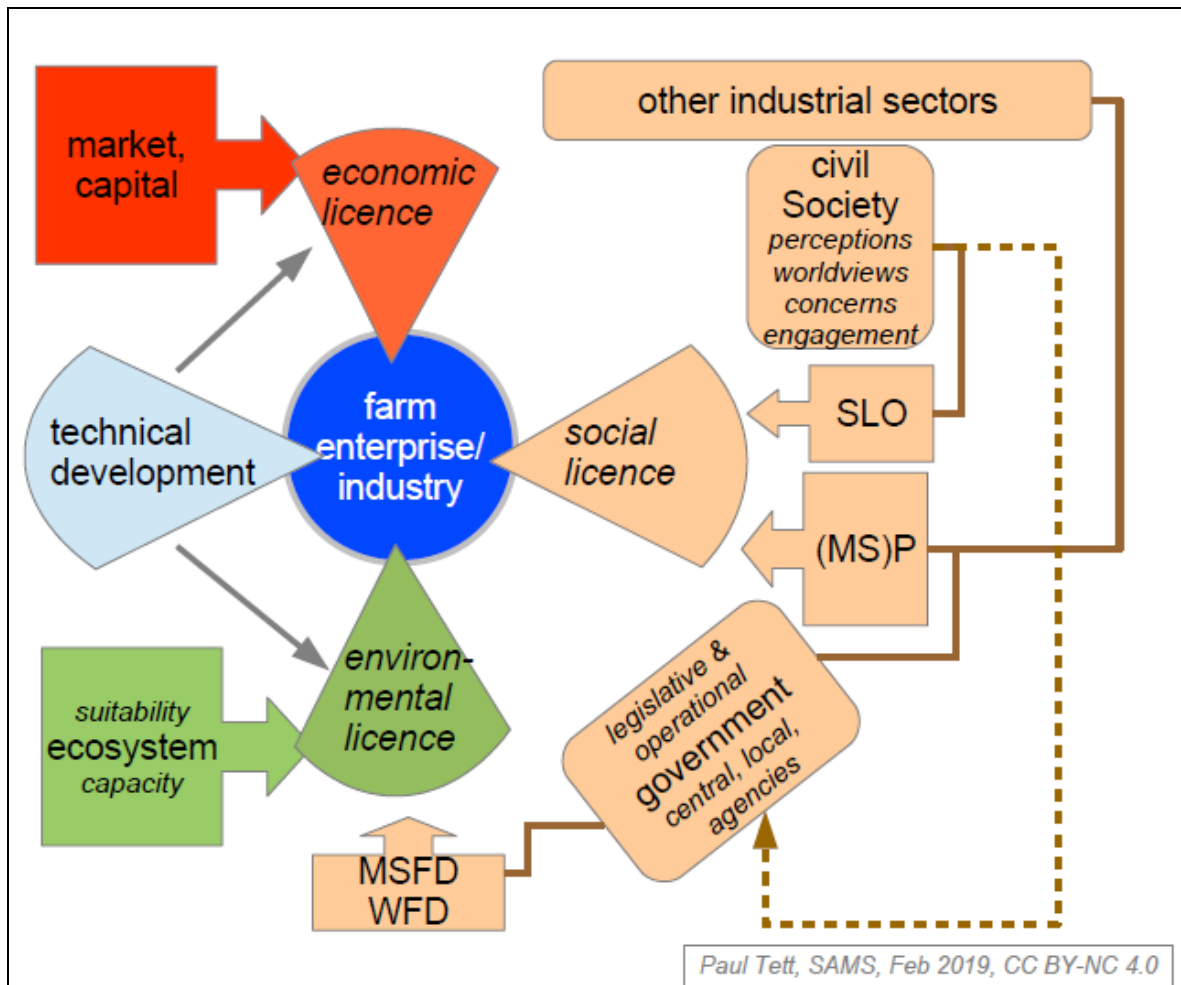




Science of/for Marine Planning
MASTS MPG Workshop
Crieff Hydro
Monday 4 and Tuesday 5 February 2019

Workshop Report SG473



The above diagram is taken from one of the workshop presentations, and highlights the interdisciplinary approach which many of the presenters showcased to demonstrate the potential contributions of integrated marine planning and management.

SLO= Social Licence to Operate

(MS)P= Terrestrial Planning/ Marine Spatial Planning

MSFD/WFD= Marine Strategy Framework Directive/ Water Framework Directive

Suggested Citation: Stojanovic, T.A. Shucksmith, R. (2019) *Report on MASTS MPG Workshop. Science of/for Marine Planning*. Report SG473. MASTS: St Andrews.



Introduction: workshop background

This multi-disciplinary, collaborative workshop aimed to raise the profile of research to support marine planning and address governance challenges for MSP in Scotland and internationally. It drew together three major groups of stakeholders representing most of the MASTS fora.

For natural and social scientists the aim was to:

- Communicate their research results to national and regional marine planners.
- Pitch the opportunities presented by their field of research
- Reflect on and get feedback from marine planners on the relevance and formats of knowledge required for marine planning.

For Planners and Marine Professionals, the aim was to:

- Understand the landscape of academic 'marine' research and the potential for collaboration
- Reflect on the information requirements for marine planning
- Influence the agenda and outputs of academic practitioners

Session 1 Science for Marine Spatial Planning, showcased research which could provide an evidence base for decision-making in marine planning. Delegates discussed the opportunities for characterising and understanding marine systems, and knowledge needed by marine planning to achieve its functional goals. Contributions were provided from MASTS CZ, Hydrodynamic Modelling, Fisheries, Aquaculture, Oil & Gas and Renewables, and marine ecologists in general.

Session 2 Science of Marine Spatial Planning showcased examples of research about marine planning from a variety of social science disciplines, which covered approaches to theorise, design and evaluate marine planning processes and outcomes, as well as a range of other key ideas and concepts being deployed in marine planning, such as Ecosystem Services, Multi-Use policies, and Protected Area Management. Delegates discussed the usefulness of these ideas to support practicable planning.

The workshop drew on traditional academic presentations, as well as extended facilitated discussion sessions between professional practitioners and the whole cohort of researchers.

MASTS Marine Planning and Governance Co-Chairs: Tim Stojanovic and Rachel Shucksmith.
2019



Monday 4- Tuesday 5 February 2019

Keynote 1 [Marine sciences for marine planning and management](#) Prof Selina Stead, University of Newcastle

[Session 1 Science for Marine Planning](#) (Chair: Fiona Mills, Clyde Marine Planning Partnership)

- [Dynamic Coasts: coastal issues and marine planning](#), James Fitton (University of Aalborg) (MASTS-CZ)
- [West coast of Scotland operational hydrodynamic modelling system as a tool for marine planning](#), Dmitry Aleynik (MASTS-Hydrodynamic Modelling)
- [Development of decision support tools for planning and governance of mariculture in Europe](#), Trevor Telfer (Stirling University) (MASTS-Aquaculture)
- [Spatial Planning for Aquaculture: tools and social issues](#), Paul Tett (SAMS) (MASTS-Aquaculture)
- [The marine planning implications of the Sustainable Scottish Inshore Fisheries research project](#), Mark James, University of St Andrews (MASTS-Fish)
- [Commercial fisheries interaction with pipelines: considerations for pipeline installation and decommissioning](#), Sally Rouse, (SAMS) (MASTS-Oil and Gas)
- [Offshore Renewable Energy SuperGen hub and collective approaches that interact with MSP](#), Beth Scott, University of Aberdeen (MASTS-Renewables)
- [Movement ecology of flapper skate in the Loch Sunart to Sound of Jura MPA](#), James Thorburn, University of St Andrews

[Reflections from Professional Practitioners](#) on 'Science for Marine Spatial Planning' (Facilitator: Tim Stojanovic, University of St Andrews).

Rachel Shucksmith, Shetland MPP; Fiona Mills, Clyde MPP; James Green, Orkney Island Council, Chris Cutts, Forth Estuary Forum, Isla MacArthur, Planning- Western Isles Council/ Comhairle nan Eilean Siar, Chris Leakey and Cathy Tilbrook, Scottish Natural Heritage.

- Introductions, progress update.
- Reflections from practitioners on science for marine planning

[Session 2 Science of Marine Planning](#) (Chair: James Green, Orkney Islands Council)

[Keynote 2 Designing Regional Marine Planning](#) Dr Tim Stojanovic, University of St Andrews

- [Can Natural Capital provide a basis for improved Marine Planning? Perspectives from a UK pilot](#), Tavis Potts, University of Aberdeen [Geography and Political Science]
- [A culture of practice for Marine Spatial Planning](#) Vincent Ongyango, Dundee University [Planning]
- [Implementing Marine Plans: rubber stamp or utopian dream ? Reflections on the first round of UK marine plan](#) Anne-michelle Slater, University of Aberdeen [Law]
- [Locally Managed Marine Areas – Global Challenges solved by Local Leaders: Shared approaches across the Pacific, Madagascar & Scotland](#), Meriwether Wilson, University of Edinburgh [Sustainability Science]
- [Ocean Multi-Use – A new frontier for marine planning: Findings from the H2020-funded MUSES project](#), Andronkos Kafas, Marine Scotland Science. [Sustainability Science]

[Reflections from Professional Practitioners](#) on 'Science of marine planning' (Chair, Chris Leakey, SNH)

Chaired discussion: ["What next for the Science of/for Marine Planning?"](#) (Rachel Shucksmith and Tim Stojanovic)



Keynote 1: Marine sciences for marine planning and management

Prof Selina Stead, University of Newcastle (now taking up a position at the University of Stirling)

For policy to make a positive difference to marine environments and to the people and industry which are dependent on its health, effective engagement is a must. But how can we incentivise marine scientists, planners and managers to work together towards shared goals beyond using funding mechanisms alone?

This talk will debate challenges around science research being limited to informing evidence-led policy making in response to marine management challenges. Creative working initiatives that fosters joint development of strategic goals will be discussed.

Proactively increasing partnerships between marine scientists and planners committed to sustainable development of our seas and coastal areas facilitates marine management efficacy. This paper will reflect on experience in getting academics and practitioners to work together in evidence led policy making aimed at identifying management interventions that are timely and context specific.

A 'systems thinking' approach and open innovation will be used to emphasize added value in building strong effective partnerships, especially between academia, civic society, industry and governments. Multi-disciplinary case studies which demonstrate impact of specific research and user collaborations to exemplify how, by working together, networks can enrich our research and lead to real life marine management solutions. Research collaborations from a range of disciplinary fields will be showcased.

Highlights

- **25 Year Environment Plan – to meet goals, natural environmental scientists need to engage better with marine planners & managers.**
- **Systems thinking and open innovation support strong partnerships between universities, government, industry and local people.**
- **Evidence-led decisions on marine management and planning must be transparent if trust and good governance is to be achieved.**

Session 1: Science for Marine Planning

(Chair: Fiona Mills, Clyde Marine Planning Partnership)



Dynamic Coasts: coastal issues and marine planning,

James Fitton (University of Aalborg) (MASTS-CZ)

The Scottish coastline is constantly changing due to coastal processes and climate change however no organisation has had an overview of recent coastal changes or their implications for society's coastal assets. Dynamic Coast, a Scottish Government project funded by the Centre for Expertise in Waters (CREW), aims to identify the location and rate of changes to the Scottish coast and the social, economic and cultural heritage assets that could be impacted by future coastal erosion.

Dynamic Coast has shown that the soft erodible coastline makes up 19% (3,802 km) of Scotland's coast, however 30-50% of all coastal buildings, roads, rail and water network lie within these erodible sections. Since the 1970s, erosion extents have increased by almost 40% over the historical extent and nationally, average erosion rates have doubled to 1.0 m/yr. If these erosion rates continue by 2050 at least 50 residential and non-residential buildings, 1.6 km of railway, 5.2 km of road and 2.4 km of clean water network, as well as significant areas of runways, cultural and natural heritage sites, are expected to be affected by coastal erosion.

Dynamic Coast <http://www.dynamiccoast.com/> informs strategic planning via Shoreline Management Plans, Flood Risk Management Planning, Strategic and Local Plans, National and Regional Marine Planning. For marine spatial planning, Dynamic Coast informs decision-making where infrastructure is sited on the coastal zone, such as new coastal defences, or crosses it, such as offshore cabling/pipelines. It assists with integrated coastal zone management decisions, including dredging licencing for removal and deposition. Dynamic Coast addresses a key gap in the national understanding of the current and future resilience and vulnerability of Scotland's coastal and marine assets. With a quickening pace of coastal erosion together with enhanced projections of climate change (UKCP18), Dynamic Coast can help inform provide the longer-term adaptation framework that society will increasingly require.

Dynamic Coasts: Coastal Issues and Marine Planning

- Dynamic Coast assessed historic coastal change (1890s to 2016) and identifies coastal assets at future risk from erosion
- A key dataset that supports both coastal and marine planning/management decisions
- Phase 2 is ongoing and includes consideration of accelerations in erosion and implications for flooding using UKCP18 data, 3D terrain models, and 'super sites'
- See DynamicCoast.com for data, maps, and reports

Dr. James Fitton^{1,2}, Dr. Alistair Rennie^{2,3}, Prof. Jim Hansom², Freya Muir²

¹Aalborg University, Denmark, ²University of Glasgow, ³Scottish Natural Heritage



Scottish Government
Riaghaltas na h-Alba
gov.scot





West coast of Scotland operational hydrodynamic modelling system as a tool for marine planning,

Dmitry Aleynik, SAMS (MASTS-Hydrodynamic Modeling)

West Scotland Coastal Ocean Modelling System (WeStCOMS) is a vital tool for making scientifically informed decisions to maintain a balance between environmental protection and sustainable growth of marine economy. Directly coupled atmospheric-ocean hydrodynamic modelling is the only available realistic approach to gain detailed knowledge on current and future state of local marine environment and its 3D physical parameters at unprecedented high temporal (hours) and spatial scales (~100m near the key coastal features). The accuracy of model validation against observations often exceeds the Regulator requirements. System capabilities has been instrumental in advancing our understanding in a number of applied marine management challenges and enabled to develop:

- Earlier-warning 'traffic-light' framework focused on harmful algae blooms and red tides detection for shell- and fin-fish operators, allowing time for mitigation response, and which is also directly linked to human health protection.
- Sea-farms inter-connectivity studies, related to sea-lice infestation and larvae pelagic dispersal, have helped to formulate recommendations for chemical treatment regimes and region-wide spatial management of the farm-sites
- Enhanced accuracy in predictions of organic matter and chemical residues spreading from aqua-farms using spatially varying current fields within NewDEPOMOD has been reflected by recent changes in statutory requirements for aquaculture site development.
- Contribution in studies of endanger, rare and/or noise-affected species, impacted by e.g. dredging or renewable constructions deployment etc, resulted in establishing Marine Protection zones or areas of limited economic activity.

To remain scientifically independent, unbiased and objective, such a modelling system should reside and develop in the Academy. Scottish Parliament RECC Committee recently recognized and strongly supported the need to establish on-line mapping server with Scotland-wide real-time access to the key parameters of a constantly varying marine environments, which is required for daily planning and protection. It is a time to urge the government to support this initiative.

OUTLINE

- WeStCOMS – is an *academic instrument* for research on how to maintain a *balance* between environmental protection and sustainable economic growth
- It designed to gain *continuously* the knowledge on marine environment at highest temporal (hours) and spatial scales (~100m) in real-time
- This model skills are validated against observations⁺, well fit and often exceed regulators requirements (SEPA 2018)
- WeStCOMS capabilities enabled to develop :
 - Earlier-warning system on ***harmful algae*** & red tides detection for shell- and fin-fish operators ⁺⁺
 - Improved spatial management of aqua-farms based on ***connectivity*** & sea-lice ***dispersal*** studies
 - Spatially-varying currents*** utilisation in NewDEPOMOD to enhance the accuracy in aqua-site *deposition impact* evaluation & improve statutory marine farming regulations
 - Studies on renewables, dredging etc, linked to noise-affected species, lead to establishing ***MPA***
- S.P. REC Committee 'is strongly of the view' in *Recommendation #22* to the government that such server with the free public access to sea-lice counts and *all key* hydrodynamic modelling information 'should be introduced in Scotland' ⁺⁺⁺.
- The most suitable & un-biased place for such mapping server is in Academia*



⁺ Aleynik et al (2016) *Harmful Algae*, 53(3). ⁺⁺ <http://habreports.org/>

⁺⁺⁺ <https://digitalpublications.parliament.scot/Committees/Report/REC/2018/11/27/Salmon-farming-in-Scotland>



Development of decision support tools for planning and governance of mariculture in Europe

Trevor Telfer (Stirling University) (MASTS-Aquaculture)

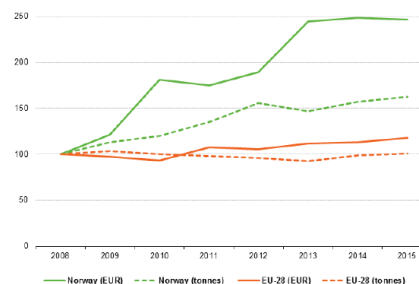
Establishing and operating an aquaculture site can be a complicated process as there are biological, environmental, socio-economic, technical and legal aspects that must be considered at all stages of planning and production. Depending on the species, system and area, there will be regulatory requirements for planning, monitoring and management that aim to minimise negative impacts on the environment and other stakeholders. These requirements can range from simple to complex and may involve the use of predictive models to provide information that would otherwise be difficult to obtain. Predictive models can simulate existing conditions, forecast future activities and show alternative scenarios which can inform any decision making process. Models, tools and approaches can be used individually or they can feed into or be part of a larger decision support system. However, the term decision support system can mean different things to different people so it is important to consult not only with stakeholders but also the developers of tools, approaches and models, to ensure the final product is useful and useable.

The work presented here includes an overview of why decision support tools are useful for aquaculture planning and governance within Europe. European-wide surveys of aquaculture governance show inconsistency in policy, planning and approaches to environmental management, and shows a clear need for more coherence and consistency of policy implementation.

This work is part of the [EU H2020 TAPAS](#) (Tools for Assessment and Planning of Aquaculture Sustainability) project which aims to support aquaculture development in Europe by developing tools, approaches, models and a decision support toolbox that can be used in supplementing licensing and development of EU policy for sustainable aquaculture. Covering the key production systems throughout Europe - including freshwater ponds, re-circulating systems, shellfish farms, marine cages and emerging technologies such as Integrated Multi-Trophic Aquaculture (IMTA) - the project uses a combination of fieldwork case-studies, real-time monitoring, lab-work, computer-based modelling, policy reviews and stakeholder consultation to develop approaches to strengthen planning and management strategies and to understand the influence and contribution of aquaculture to ecosystem services.

Background –

- EU aquaculture produces 1.3 million tonnes worth EUR 4 billion
- EU aquaculture provides jobs for 39 000 people
- Trends overall: volume stable, but value slowly increasing?
- But compare this to the Norwegian aquaculture sector?
- Why?
- Major “bottleneck” is effective and efficient planning, regulation, and licensing of aquaculture



Note: 2015 figures for EU-28 aquaculture production in volume and in value are estimated by Eurostat

Eurostat, 2017



Spatial Planning for Aquaculture: tools and social issues,

Paul Tett, SAMS (MASTS-Aquaculture)

The aim of the AquaSpace project (H2020 contract no.633476; 2015-2018) was to "provide increased space of high water quality for aquaculture by adopting the Ecosystem Approach to Aquaculture, and Marine Spatial Planning".

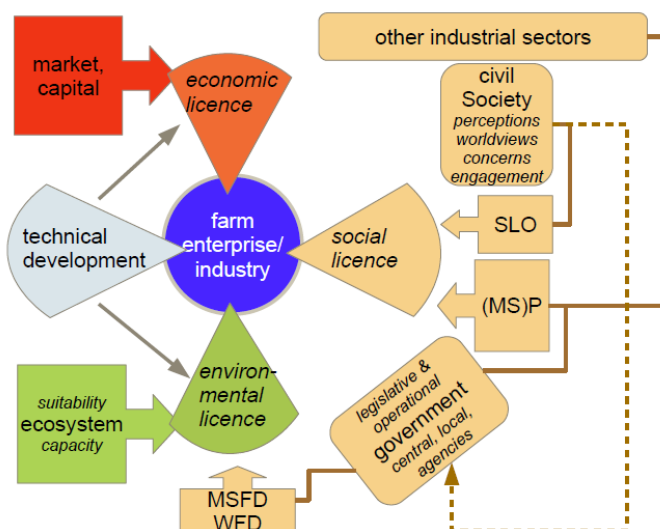
Partners developed or improved a number of (software) tools to support spatial planning by integrating environmental, societal, regulatory and economic information. These were tested, and spatial constraints explored, at 15 case studies at 17 sites in Europe, North America, China, Australia and New Zealand, involving the cultivation of salmonids, perciforms, freshwater carp, and bivalve molluscs.

Stakeholders in the case studies were surveyed about the major barriers to aquaculture growth in their localities. They included spatial, fish health, environmental and regulatory issues. Also important were issues related to social acceptance of aquaculture. These included community opposition and conflicts with tourism and fisheries, which occurred across the spectrum of different species and production methods.

These findings illuminate two contrasting views on Marine Spatial Planning for Aquaculture. Is MSP a technical process that can be carried out more quickly and efficiently with the aid of tools such as those developed during AquaSpace? Or is MSP part of societal governance, with tools informing and empowering community agency and (hopefully) leading to greater societal acceptance of the expansion of aquaculture.

Spatial planning for aquaculture: tools and social issues

- Europe wants to expand aquaculture, BUT:
- nearshore waters nearly full because of prior acquisition of space by other sectors and growing opposition to aquaculture
- is this a technical challenge or an issue for social democracy? how can tools help





The marine planning implications of the Sustainable Scottish Inshore Fisheries research project,

Mark James, University of St Andrews (MASTS-Fish)

The majority of the world's fishing fleets is made up of vessels of less than 10m in length and operating in coastal waters – most are unregulated. In Europe 80% of fishing vessels are 10m and under in overall length. For Scotland the of the ~2000 vessels in over 1,500 are in the 10m and under category. All EU fishing vessels over 10m are obliged to carry Vessel Monitoring Systems (VMS) which report the vessels track and speed to fishery regulators. The resolution of these data is often sparse and is principally collected for fisheries compliance and regulatory purposed. In 2020, Scottish Government has committed to initiating some form of vessel tracking for the 10m and under fleet and there is pressure to implement similar tracking regimes across the EU. Through the SIFIDS project a suite of low cost, open source technology, processes and systems is being developed to provide data that will support better fisheries management from an industry and regulatory perspective. The project also fully recognises the need to integrate better resolved temporal and spatial fisheries data into marine planning and strategic decision making processes.

Context – Compliance and Planning

- The people of Scotland are the custodians of its seas out to 12nm – and through Scottish Ministers – Marine Scotland and other agencies are charged with ensuring our waters are: – **clean, healthy, safe, biodiverse, and productive...**
- Emphasis must be on the **users** of this “natural capital” to be able to **demonstrate** that they are doing so **sustainably**.
- Need to be able to know how much fish and shellfish can be taken out of the sea sustainably – based on fisheries dependent and fisheries independent surveys – coupled to management reference/indicators - points/limits etc.
- **For inshore fisheries (small scale fisheries generally) we do not have the data to demonstrate sustainability for many fished stocks!**
- **No robust data to inform spatial management and planning!**
- Many countries looking to monitor inshore fleet
- MMO/IFCA's starting to use iVMS systems

CRMG

Coastal Resources
Management Group



SIFIDS
Scottish Inshore Fisheries
Integrated Data System
a System



Commercial fisheries interaction with pipelines: considerations for pipeline installation and decommissioning,

Sally Rouse, SAMS (MASTS-Oil and Gas)

Commercial fisheries and oil and gas extraction are both spatially extensive industries in the North Sea (NS), and inevitably there is physical interaction where the two activities coincide. Regular contact between fishing gear and pipelines may risk pipeline integrity and could lead to gear snagging. It is also known, anecdotally, that some vessels target pipelines, potentially benefiting from local artificial reef effects. The impacts of pipeline decommissioning options (removal vs. in situ) on commercial fisheries must be evaluated as part of the consenting process. Vessel Monitoring System (VMS) data for the Scottish demersal fleet were analysed with spatial data on pipelines. Approximately one-third (36.1%) of trips fished within 200 m of a pipeline over a 5-year period, suggesting that pipelines are subjected to regular interaction with fishing gear. The fishing effort (in hours) associated with pipelines was 2.52% of the total effort, compared to 1.33% in an equivalent area of seabed 1 km away, implying modest aggregation of fishing around pipelines. Only a small percentage (0.93%) of fishing trips actively targeted pipelines as fishing grounds. The highest level of fishing around pipelines occurred in the northeast NS. Pipeline sections with >100 h of fishing were typically larger diameter pipelines. The results suggest that pipeline decommissioning may have both negative (displacement of aggregated effort) and positive (reduced snagging potential) outcomes for commercial fisheries. It is recommended that where there is little or no fishing activity associated with pipelines, receptors other than fishing should be prioritized when selecting decommissioning strategies. Additionally, the intensity of fishing around pipelines should be used to inform the frequency of post-decommissioning integrity monitoring for any pipelines left in situ.

Summary & Take Home Messages

- 1 There is significant overlap, and interaction, between the oil and gas and fishing industries in the North Sea
- 2 Substantial decommissioning over next 30 years. Decisions over decommissioning practices will have implications for the fishing industry and tax payers
- 3 Importance of a regional and strategic approach to decommissioning. This requires a common, transparent evidence base
- 4 Data held by O&G industry and VMS fishing data valuable for developing this evidence base
- 5 Must apply caution to spatial representations



Offshore Renewable Energy SuperGen hub and collective approaches that interact with MSP,

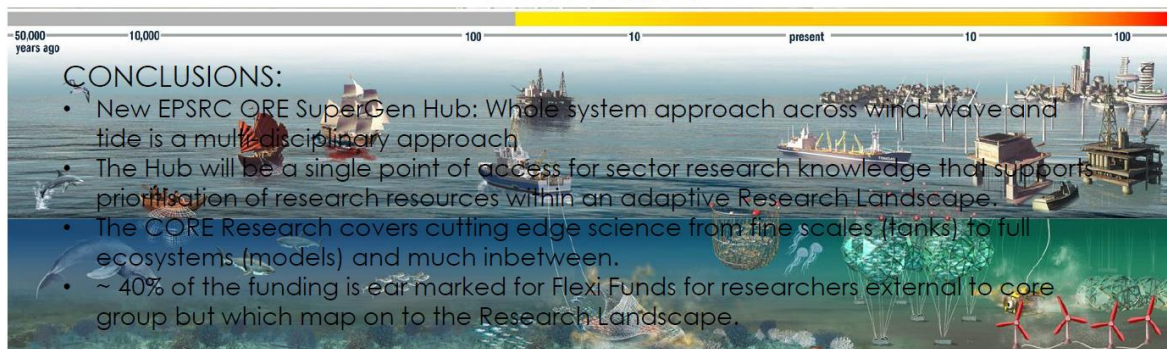
Beth Scott, University of Aberdeen, (MASTS-Renewables)

This talk will introduce the new Offshore Renewable Energy (ORE) SuperGen Hub 2018-2022: Bringing together wind, wave and tidal energy with ecologically sustainable designs. To arrive at a sustainable future we need offshore renewables to succeed and to do so we need to work together. There have been showstoppers in the past that arose from lack of certainty in ecological considerations. There will be conflicts again in the future unless we can co-design devices, array layouts and site locations of multiple very large scale arrays such that proper cumulative effects and trade-offs; ecological, economic and social, can be assessed.

The new ORE SuperGen Hub will have at its core a 'whole-systems' approach and this talk will outline the concepts and roadmap behind that statement. The talk will also present a brief background on what environmental issues are important and why – at different spatial scales. It will cover a range of up to-date solutions for the design of data collection and analysis to deal with these concerns and finishes with a range of suggestions for potential avenues for future collaboration between ecological, social and engineering sciences.

Website www.supergen-ore.net

Offshore Renewable Energy (ORE) SuperGen Hub and collective approaches that interact with MSP.



McCauley et al. Science 16 Jan 2015

Prof. Beth Scott

b.e.scott@abdn.ac.uk





Movement ecology of flapper skate in the Loch Sunart to Sound of Jura MPA,

James Thorburn, University of St Andrews

The effectiveness of Marine Protected Areas for mobile species has been, and still is, questioned. For static management to be effective for species with high migration capability it should either protect a suitable critical life history stage, or the species must demonstrate some level of fidelity to an area, allowing management to affect it for a disproportionate amount in comparison to other areas. Either of these scenarios require detailed knowledge of the species to determine if an MPA would be a suitable management strategy. This level of data is rarely available, especially in the marine environment. However, there are some species for which we do have sufficient data, one of these is the Flapper skate (*Dipturus intermedius*). Data of various forms, collected over many years and involving many stakeholders, led to the designation of the Loch Sunart to the Sound of Jura MPA to help conserve this species of skate, the largest in the world. This talk will give an overview of the use of MPAs for mobile species with focus on the Flapper skate in Scotland.

Summary

MPAs can be part of a successful management strategy for mobile species if used in suitable areas

Lots of regional species specific data required

Offer good research opportunities where both management and science can work together and benefit





Reflections from Professional Practitioners

Rachel Shucksmith, Shetland MPP

The Shetland marine plan aims to guide marine development. The planning process also benefits from decision support tools for developers which could cover economic aspects, community interactions, spatial aspects, and model the resource to produce high quality outputs. It's key to fit these tools to the marine planning process in a way that is easy to understand and specifically, to enable developers to track issues and find locations where conflicts can be minimised. More research is needed to understand MSP process, looking at the relationship between planning and licensing (speed of the licensing process, right locations for development, considering social aspects, minimising conflict).

Fiona Mills, Clyde MPP

Currently, there is a Pre-consultation draft plan which has been developed in response to issues identified in the Assessment, and developed through workshops, working groups, considering sectoral ambitions for the future. There is EMFF funding on the ground to talk to local communities and stakeholders on influencing development of the plan and informing people how this would benefit the marine environment over the next 2 years. Key focus for the partnership is discussing how to prioritise issues, what long term work needs to be done, how to work on engagement, and how planning decisions add value to delivery of the marine plan. Priority areas will be identified, e.g. spatial work on aquaculture, fisheries. Spatial data on fishing activity in the planning process and ecosystem services with fisheries need to be addressed.

James Green, Orkney Island Council, (soon also to be Orkney Marine Planning Partnership)

Marine Planning Partnership is currently being established in line with the provisions of the Marine (Scotland) Act- with the identification of a delegate, advisory group, stakeholders and assessment of requirements in terms of capacity, e.g. for community engagement. Key work elements in mid 2019 will be to start on a draft marine regional plan and state of the environment assessment. These will address important socio-economic and environmental issues. In addition, ongoing work on a range of development proposals, e.g. spatial planning for aquaculture (e.g. drawing on Guidance document in 2017- sustainability of aquaculture as a food source, and what are the environmental limits? Capacity for fisheries development. Stakeholder engagement in offshore renewables. Questions about developer's business models, revenues, benefit to local communities, and role of crown estate revenue.

The regional marine planning process has a limited resources and skills base. Regional planning can't add value unless it has access to skilled people and financial support, and is able to fund research to address data gaps, but they won't get funding unless they can prove the value they can add. Additional challenges of lack of coordination between agencies.

Chris Cutts, Forth Estuary Forum

Recent EMF proposal to assess the state of the east coast of Scotland. This could constitute a 1st step in regional marine planning for the East coast. Not all marine issues cannot be solved by marine planning, however, and MSP is not a panacea. Future MSP requires continual improvement and a supporting process of intense research. Current major challenges: background data on the state of the environment and links to environmental impact assessments; need to solve issues beyond the scope of regional planning; Integrating the national and regional marine planning systems; the necessity but costs of stakeholder engagement.



Further discussion: Plan development- plans need to be consistent and aspirational and authorised by appropriate organisations. Plan objectives should reconcile different policies; but stakeholders are not always in agreement about aspects. Regional marine plans can begin to apply high level strategy, identify appropriate levels of criteria, and set aspirational policies for an area.

Isla McArthur, Western Isles Council/ Comhairle nan Eilean Siar

RMP / MSP NAVIGATOR

The Comhairle is part of a consortium submitting a proposal to the Interreg North Sea programme as part of a wider bid for funding called 'MSP Navigator'. An element of the project is to support RMP in the Outer Hebrides. The project has made it through to stage 2 of the process, and if ultimately successful, will start in October 2019 and run until 2022. They are still working on refining proposal and costings as it will require match funding – Overall objective focuses on innovative digital solutions fostered through e-services in MSP, such as gaming based planning support platforms, interactive stakeholder engagement tools, and digital cumulative impact assessments of land-sea interactions.

CROWN ESTATES – LOCAL ASSET MANAGEMENT PILOT SCHEME

Comhairle's bid to manage the Outer Hebrides foreshore and seabed out to 12nm has progressed to Stage 2 of Crown Estate Scotland's Local Asset Management Pilot Scheme process. Bid focused on community engagement and will be delivered by a new Outer Hebrides Marine Leasing Partnership with a wide range of representatives.

The Partnership will receive lease applications then invite host community to carry out a Community Impact Assessment; their recommendation will be a material consideration in the Marine Planning Partnership's subsequent consideration of the application. The partnership will consult widely, and present a recommendation, with suggested lease conditions to the Marine Licensing sub-committee made up of elected member representatives. If approved, the application will be passed to Crown Estate Scotland for issue of lease documentation and lifetime management of the lease.

OH-SEAS

Comhairle is currently a partner in an INTERREG funded project (*via MarPAMM) called 'Seas of the Outer Hebrides' (in partnership with Marine Scotland, WWF and Scottish Natural Heritage) to develop a shared vision and co-produce a management plan for Marine Protected Areas (MPAs) within the Outer Hebrides Region.

This is a 3 ½ year project and a project officer has recently been appointed and is due start in the next few weeks (the post is being hosted by Lews Castle College). The project has a lot of cross over with the MSP Navigator bid, as one of its key project aims is to inform the development of a future Regional Marine Plan.

OH-LDP

- Team resourcing still an issue / policy team continuing to assist DM side of planning. If Crown Estate Pilot Project and MSP Navigator proposals are successful it is proposed there will be additional staff resources to manage these projects.
- Adopted the Local Development Plan in November 2018
- Dev Strategy now has a 'Marine and Shore Environment' category / References to NMP
- Aquaculture Supplementary Guidance currently being reviewed, 6 month deadline, but political context has changed and upcoming reviews of consenting and regulation.



Andronikos Kafkas

Update: David Pratt is leading the Marine Planning team at Marine Scotland; In 2018 Scotland's National marine plan [implementation was reviewed](#). In addition, new data sets will be released for the second edition of Scotland's National Marine Atlas. A [Sectoral Marine Plan Offshore Wind](#) underwent consultation in 2018. Andronikos is leading a group in Marine Scotland Science focusing on Renewable energy; the aim is to develop scientific advice in terms of marine offshore renewables, and currently the main field of activity is offshore wind. Work includes defining areas for development, statistical and environmental assessment with socio-economic aspects. 2nd steering group meeting to refine areas. Consultants' have been appointed in order to perform assessments for shallow and deep areas (22 areas) mostly east coast and some on the west coast. This will include qualitative analysis and risk assessment of development proposals to 2050..

Chris Leakey, SNH

SNH is pushed to transition from giving lots of advice on individual developments to having more influence on what marine plans are saying. This is partly because their staff resources are increasingly limited, but also because a good plan should (a) reduce the number of inappropriate proposals coming forward, (b) identify appropriate mitigation and / or (c) give a clearer steer to decision-makers with less input required from statutory advisors. Consequently, they want plans to be as specific, spatial and robust as possible. Reflections: We've heard about projects which can be split in to two categories: (1) big complicated projects trying to address multiple issues for an international audience, and (2) targeted projects addressing specific problems for specific areas. From the point of view of a marine planner, it's much easier to take the results from specific local projects rather than big complicated projects dealing with many factors. How can we make the info/ conclusions from big projects available to and usable by practitioners? Make sure those projects involve some practitioners from the outset so that the outputs are practitioner-ready. Data also needs to be publicly available to be used within public process. Without this there is likely to be a need for follow-on projects, for which there is unlikely to be funding. .



Session 2 Science of Marine Planning (Tuesday 5 February 2019)

(Chair: James Green, Orkney Islands Council)

Keynote 2: Designing Regional Marine Planning

Dr Tim Stojanovic, University of St Andrews

During this talk I will outline some of the contributions of the social sciences to marine planning, by the major disciplines of anthropology, archaeology, demography, economics, geography, psychology, political science & international relations, and sociology and also the applied sciences law and planning. These fields have much to offer for the evidence base of marine planning, but most of these disciplines still have a very terrestrial focus, and questions remain about how to operationalize many concepts. For some of this research, marine planning itself becomes the phenomena of investigation- I will argue for the importance of a 'science of marine planning' which can act as a support and also a respectful critic to practice. I will also discuss some of the ways in which scholarship can successfully partner with professional practice, as well as some challenges and obstacles to science-policy collaboration. We will end the session with some applied exercises to explore a specific example, how the heuristic of 'soft systems methodology' can be applied to the design a regional marine planning process in a participatory and systematic way.

Key thoughts



- 1. Social sciences (perhaps excepting economics) are only recently beginning to build an evidence base for the oceans**
 - MASTS Marine Planning and Governance Forum can provide a network for this effort in Scotland
 - How can soc sci. translate concepts into easily usable 'heuristics'?
- 2. To contribute to real world solutions, social sciences will need to partner with one another, professional practitioners, natural sci. (+arts)...and the framing of sustainability science can assist this.**
 - This entails understanding one another's language, goals and funding mechanisms.
- 3. Social sciences have potential to develop a knowledge base about the phenomenon of marine planning [aka 'a critical friend']**
 - This is important if we want to learn lessons about what works well (accepting the need for local specificity)



Marine Alliance for
Science and Technology for Scotland
a marine partnership for Scotland

Can Natural Capital provide a basis for improved Marine Planning? Perspectives from a UK pilot

Tavis Potts, University of Aberdeen [Geography and Political Science]

The concept of a natural capital and ecosystem services (ES) approach emerged through the Millennium Ecosystem Assessment (2005) which elaborated how ecosystem change entwines with and affects human wellbeing. The UK National Ecosystem Assessment from 2009 to 2014 explored the trajectories and impacts of UK ecosystems across a range of biomes, the services and societal benefits provided and how these are changing over time. The UK-NEA created an emerging scientific and policy interest in the approach, particularly how it affects different ecological settings and how this could be incorporated into policy advice and decisions. In 2018, with the release of the UK 25 Year Plan and the draft Scottish Environment Strategy, Natural Capital has emerged as central policy doctrine. Natural Capital and ES are an integrated concept, with the former representing the stocks of 'capital' and the latter the flows of services and benefits. While numerous strategies, policy pronouncements and initiatives are moving toward a natural capital approach in environmental governance, a central question remains about its utility for marine planning? Can a natural capital approach be integrated with or influence marine planning processes? What value does it add? This seminar will explore some of the central tenets of a NatCap approach, explore the current policy landscape and reflect on four recent pilot projects that have tested a natural capital and ecosystem services approach in coastal planning in Scotland and England. It asks the central question – should and how can MSP be reformed to incorporate a Natural Capital approach?

Marine Ecosystem Services & Benefits



"We need to understand the **full value of the marine environment** and incorporate that into the decisions we take: this is key to the '**natural capital**' approach..."

"...set gold standards in protecting and growing **natural capital** – leading the world in using this approach as a tool in decision-making".

"Oceansare critical for biodiversity and **ecosystem services**."

"Our environment underpins our **well-being** and prosperity..."



A culture of practice for Marine Spatial Planning

Vincent Ongyango, Dundee University [Planning]

Though still relatively new, the development of marine spatial planning has been based on the premise that as a rational planning process, it can be applied following universal principles and steps informed by land-based inspired theoretical underpinnings. However, within this process, differences between marine and terrestrial environments are being overlooked, potentially affecting the way in which the marine environment is understood and valued, and the development of a culture of practice for, and specific to, marine spatial planning. By framing planning as a cultural construct, this paper aims to explore the extent to which land-based rationales are affecting the development of a marine spatial planning culture of practice, with its own ethos and shared values. A culturalised planning model adapted from [Knieling, J. and Othengrafen, F. (2015). Planning culture—a concept to explain the evolution of planning policies and processes in Europe? *European Planning Studies*, 23(11), 2133–2147] is used as a framework. Whilst acknowledging the importance of the contributions from land-based planning and the ecological sciences, the findings suggest that those unconscious beliefs and perceptions affecting society's understanding of the marine environment should contribute to informing shared values for marine spatial planning practice.

'summary / take home message'



1. Development of MSP

- rational planning process
- land-based inspired theoretical underpinnings

2. Differences between ME & TE overlooked

3. Affects how

- ME understood + valued
- *Culture of practice for, & specific to, MSP.*



Implementing Marine Plans: rubber stamp or utopian dream ? Reflections on the first round of UK marine plan?

Anne-michelle Slater, University of Aberdeen [Law]

This presentation outlines the initial stages of a study of UK marine plans through the prism of implementation theory. The starting point is an examination of the aspiration and intentions behind the UK Marine Acts. It reviews the UK Marine Policy Statement, Scotland's National Marine Plan and the first regional marine plans in England. There is an acknowledgment of their success in establishing the need and process for developing marine plans, but criticism of their effectiveness in the implementation of marine policy via decisions.

The research will include consideration of the more recent marine plans for England, the Northern Ireland Draft Marine Plan, the emerging Welsh National Marine Plan and regional marine plans in Scotland. There will be an exploration of the means by which policies can be used to shape decisions, including through explicit and transparent processes; specific reference to marine plan policies and creative use of conditions and planning obligations, as part of marine licensing decisions. The study will conclude with an exploration of the benefits that legal challenge would bring to the process, for example, through examinations of draft plans, marine licenses declined on the basis of MSP policies, and appeals against such decisions.

Initial conclusions indicate that effective implementation of marine plans require them to be directive; utilise the best evidence to formulate policies, as well as harnessing political will. Whether lessons have been, or should be, drawn from the land use planning system will be addressed.

Take Home message (in a bottle)



- Difference of 10 years
- Impressive achievement and step change

Initial Conclusions for implementation of U.K marine plans

1. Directive documents
2. Utilise best evidence for policies
3. Harness political will
4. Lessons from land use planning ?

But

- wider context of sea basin planning ?
- Ocean planning ?
- Biodiversity Beyond National Jurisdiction ?



Locally Managed Marine Areas – Global Challenges solved by Local Leaders: Shared approaches across the Pacific, Madagascar & Scotland

Meriwether Wilson, University of Edinburgh [Sustainability Science]

This talk will take a broad look at the concept of 'Locally Managed Marine Areas' (LMMAs), for which the genesis was largely the Pacific islands, where traditional knowledge and local, ancestral ownership of coastal areas supported the notion of local decision making and management, in particular around small scale fisheries. The LLMA concept is now being taken up in other parts of the world, in particular the Indian Ocean (Madagascar, Mozambique), where the coastal-marine areas are not locally owned per se, but locally managed. In Scotland, starting with the UK's first 'voluntary marine reserve' around St Abbs, other areas are becoming in effect LMMAs through different means, e.g. from Arran to Fair Isle, with local NGOs providing catalytic support through local leaders. This emergence of local management in the context of, and in parallel with, emerging horizons of different scales of marine spatial plans (MSP) offers innovative opportunities for locally relevant leadership to partner with evolving governance of more formal paths. Examples of innovative and entrepreneurial leadership that has been pivotal to successful LMMAs in Scotland, the Pacific and Indian Ocean will be discussed, to explore developments in this context that may be valuable to Scotland's marine coastal communities in particular.

Key Themes |

1. Emerging Tensions between MPA scales, motivations and management:
 - large scale > conservation species, ocean focused
 - smaller scale > people, food security livelihood focused
2. Examples of Large Scale MPAs (Pacific), Locally Managed (Scotland)
3. Community based Aquaculture (Madagascar)
4. Concept of access and benefit sharing - stakeholders and benefits
5. Systems thinking: Site to systems scales, Social – ecological systems
6. Need for networks, leaderships and partnerships at all scales



Ocean Multi-Use – A new frontier for marine planning: Findings from the H2020-funded MUSES project.

Andronkos Kafas, Marine Scotland Science. [Sustainability Science]

The ever-increasing demands on ocean resources in all European Sea Basins and resulting pressure on the use of ocean space, are underlining issues of compatibility (or conflicts) between different maritime uses as well as between economic activities and environmental protection. As a result ocean space is a valuable asset deserving special attention in marine management and planning.

Management should be systematic, coordinated, as well as account both for existing maritime uses and anticipate future needs. This means that co-uses, synergies and multiple spatial uses should be promoted as much as possible. Integrating different functions/ uses/ activities in time and space in the sea, in a complementary way, termed here as Multi-Use (MU), can offer multiple benefits.

While there are good reasons for promoting MU, its realisation is rendered difficult by conceptual problems and the need to overcome sectoral demands, vested interests, and any other barriers associated with existing political institutions and practices. The goal of Multi-Use in European Seas (MUSES) project is to identify and highlight the real opportunities for MU in European Seas.

The MUSES project has explored practical solutions on overcoming existing barriers and minimizing risks associated with MU development at a local level, through a range of case studies around Europe. MUSES case studies focused on the challenges arising from tensions between maritime activities demanding ocean space. Key findings suggest that combining compatible activities in the same marine space can serve to share and reduce costs, and generate further synergies between those activities. MUSES case study findings focusing on offshore energy will be presented, including the environmental, spatial, economic & societal benefits of MU, as well as practical solutions to overcome identified barriers.



Reflections from Professional Practitioners on science for marine planning

Summary of main points from the session

1. The combination and inclusion of both natural (ecological) and social scientist advice in marine planning processes was emphasised as highly important and beneficial in dealing with the challenges associated with marine planning.
2. The importance of social science skills and training for marine planners was highlighted and the fact that new graduates from MSP and related degrees lack some key social scientific skills (e.g. effective stakeholder engagement). This is something that should be raised with marine planning graduate and post-graduate course leaders.
3. There needs to be more capacity building and raising public awareness and education in marine planning, especially in the first iterations of the plan – participatory mapping was profiled as a tool for this (cf Potts presentation).
4. The benefits of Multi-Use Framework (cf Kafas presentation) for marine planning should be built upon and we should begin to work out how marine planning can incentivise (e.g. financial incentives) multi-use of the oceans

Practitioner comments from the session

Chris Leakey (SNH)

Chris reflected on the role of social science in Marine Planning (MP) – If the purpose of marine planning is to guide decision making, then the role of social sciences within that is to ensure that the vision and policies of a plan, and the influences that flow from it, are a good reflection of the needs and wishes of a well informed society. This should help give Ministers the confidence that what is being proposed are a true reflection of the ‘social licence to operate’ and enable positive change even where controversial with some stakeholders. For Regional Marine Planning (RMP) the final adoption of the plan is decided by the Minister and therefore Chris noted that the regional marine planners will be challenged to convince Government of the value and soundness of their plans.

Key reflections:

- Many of the Science for Marine Planning presentations seemed to be suggesting that we require various forms of capacity building in marine planning. How do we deliver this?
- Participatory Mapping– how can we move beyond the more engaged stakeholders (the ‘usual suspects’) and encourage other kinds of stakeholder to get involved? Does participatory mapping provide an opportunity? How can we harmonise this and how do we avoid consultation overload? Marine Planning Partnerships (MPP) will have to talk to Marine Scotland and make sure this is compatible with / makes use of NMPi and that there is a process of verification between participatory mapping and real data (two-way process).
- Tavis presentation and Andronikos presentation – the process is also the product – getting communities engaged in MSP and social learning, is a key output. Agree that capacity building is important
- But how much can we utilise data we have already got, and what are the limitations of participatory mapping concerning data overload and lack of validation?
- Meriweather Wilson – involved in participatory mapping in Seattle – it has an ‘in the moment element’ because it is often digitised from real maps and archived.

James Green (Orkney Island Council)



Key reflections:

- Advocates of marine planning need to demonstrate the benefits to business operating in the marine environment.
- The seabed is a public asset, whereas on land the behaviour of land owners is highly influential on the achievement of planning outcomes.
- Anne-michelle presentation – the fact that there are no or very few objections to marine licences might be considered as a measure of the success of marine planning
- First iterations of plans (Clyde and Shetland) always will be high-level and strategic but the plan making process and plans themselves should evolve overtime to become more spatially articulate.
- Meriwether Wilson – the examples of communities engaging in MP given by Meriwether should be an aspiration for Scotland to engage in the evolving Regional Marine Plans.
- Andronikos presentation – concept of passive co-existence is persuasive and we should accept the benefits of Multi-Use; but how can marine planning incentivise (e.g. financial incentives?) multi-use of the oceans because this won't happen automatically?
- James Thorburn presentation – possibilities of linking on environmental data on marine protected areas with social evidence about perceptions and benefits of the marine environment

Fiona Mills (Clyde Marine Planning Partnership)

Key reflections:

- Public engagement – how can we get people understanding and talking about natural capital?
- Different weighting giving to different stakeholders – what weighting should we give to coastal communities that rely on the sea
- It's early days to be able to see the impacts of MPAs
- Identifying Multi-Use options can be a key benefit of RMPs
- Marine planning requires the integration of ecosystem services, as currently this is not being considered in the decision-making process.
- Terrestrial and Marine Planning- it is helpful to grasp the differences. MP has come from a more environmental background but it is being bolted into terrestrial planning system
- Question to reflect upon – if MP has developed from ecological or terrestrial planning background. How can planners pick up those additional skills which are relevant to the marine context? How easily can social science provide tools to help marine planners?
- Need to keep partnering with the science community – sound decisions are backed by science
- Comment by James Green – one element which is lacking in current MSP curricula is study of the plan-making process.
- A Key Challenge: How to best facilitate stakeholder engagement?

Rachel Shucksmith (Shetland Marine Planning Partnership)

Key reflections:

- Some applicants for marine planning posts are not employable as they lack relevant skill sets and need considerable on the job training. Much of the training has emphasised natural science skills and techniques. Need social science skills as a marine planner in order to deal with the challenges of understanding and engaging with societal values.
- First iterations of Marine Plans are high level and they need to have more engagement with the community and to be more specific
- You need to have rigorous standards and principles when collecting data for it to be useful for the Marine Plan. The national plan demands standardisation of data, but we should also value and include the unique data of our regions e.g. some recreational activities are unique to certain parts of the coastline.

Tavis Potts (University of Aberdeen)



Key reflections:

- Mapping activity – how to understand the links between services and benefits. You can get to benefit by number of different activities. Tavis used a golf course development as an illustration where they ecosystem service regulatory benefits and downplayed and recreation benefits highly valued. Development often involves changing a marine activity to achieve particular benefit, and we should also be aware that the motivation to change the activity can be political.

Minutes of Chaired Discussion “What next for the Science off/for Marine Planning?”

1. How can regional marine planning overcome resource limitations and add value?

- Regional MSP is at the right scale (e.g. compared to England) to provide for local data collection and engagement
- There is a willingness to do partnership-working which can involve input to marine planning from parallel processes and initiatives
- There may be exceptions to National Marine Plan Policies based on unique regional conditions and values.
- Define values/priorities locally by bringing people together for social learning amongst stakeholders. An issue to explore is the primacy of regional Vs national policies... sometimes it is appropriate for a regional policy to differ from the national direction.
- This is a chance to develop a unique vision for each marine region
- There may be opportunities to support innovation and policies (e.g. bespoke regional tourism offer)
- The marine plan can identify ‘multiple-use’ opportunities (cf presentation by Marine Scotland Science). However, it is recognised that there will be winners and losers where certain sectors are prioritised or certain areas preferred for certain kinds of development
- Marine planning does more than make a plan, and there is need to consider how the regional marine planning partnerships can contribute at the implementation phase
- In a resource limited context, there is a need to join up multiple streams of funding to develop the plan and a strong evidence base (academic research projects, private and third sector initiatives)
- Take learning from one place (or from national level) to implement local solutions/inform local marine planning. The MPG forum (and workshops in particular) are great for making new contacts to help Regional Marine Planning Partnerships do this.
- Improving cross-interest mutual understanding of each other’s issues and realities
- Educating/informing the public so they can be informed participants. This should include schools... Orkney Islands Council aiming to do schools work related to marine plan development.

2. What more can researchers do to make their toolboxes and outputs more usable by marine planning practitioners?

- There are challenges with evidence gaps which still need to be overcome. More research is required.
- Take the approach of developing software/hardware which is interactive and allows public or practitioners to ‘play with’ scenarios (models hidden underneath)
- ‘Toolboxes’ can present an overwhelming material, and it may not be immediately apparent how these tools can help solve a given problem or support a particular decision...therefore toolboxes also need to come with the experts to help apply them....but
 - Academics are restricted in their time and resources to do this.
 - This needs pricing/costing into research and development (NB research council ‘knowledge exchange’ grants)



- It is not easy for academics to be fast and reactive (so opportunities to partner with consultancies?)
- Need to let planner's questions drive the choice and design of tools
- Accessible reporting of science/data is desirable, needing a public interface/interpretation (probably via a web-server). There was desire to improve the familiarity of the public with the condition of the marine environment by developing visual reporting akin to weather forecasting (ocean forecasting) [*will the next iteration of the Marine Atlas achieve this?*]
- A central resource that collates the latest science of and for marine planning, but which also encourages scientists to provide lay summaries of their outputs (can the RTPI support this sort of resource, thereby also helping them branch out in to marine planning?)
- Scientists should be linked to practitioners at project outset/conception, particularly for big complex projects that can easily lose sight of the application of the work

3. What can MASTS MPG usefully do to support this work?

- Link the needs and objectives of planners to tools that scientists and social scientists provide.
- Create a space for conversation on how to best do this
- Regular MASTS MPG meetings (possibly every two years)
- Bespoke science session at MASTS ASM
- Early communication and input to scientists in model building
- MASTS MPG to facilitate conversations which link sectors to marine plans in order to quantify trade-offs at regional scales
- Can MASTS + Marine Planning partnerships provide links to tools/expertise which point out who is active in research and what is on offer?
- Is there any scope for MASTS MPG to act as a sense check in the development of draft marine plans?
- Develop the small grants to more explicitly address the science challenges faced by planners (so, tackle specific problems informed by planners themselves)
- Giving direction to higher education for marine planning? There was some suggestion about developing a 'curriculum for marine planning'. There are some difficulties around this, related to the limited demands for training and sharing of curricula. But facilitating internships and masters opportunities may be another way to develop skills for marine planning professionals of the future.
- Can the forum help find innovative approaches to finance the marine planning process?
- More workshops like this, bringing together varied scientists with practitioners

Addendum

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