Supporting **I**mplementation of **M**aritime Spatial Planning in the **Celt**ic Seas

Component 1: Supporting implementation of MSP

Sub-component: C1.2.3 Stakeholder Engagement

Deliverable 9: Report on potential approaches for stakeholder engagement on MSP and pilot testing at local transboundary level

D9 Clyde Case Study: Using 'serious games' in cross-border marine planning: an innovative approach to stakeholder engagement piloted in the Clyde Marine Region, Scotland

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Acronyms

AGMACS	Advisory Group on Marine & Coastal Strategy
CMPP	Clyde Marine Planning Partnership
DG MARE	Directorate General for Maritime Affairs
EU	European Union
EwE	Ecopath with Ecoism
GIS	Geographic Information System
IC(Z)M	Integrated Coastal (Zone) Management
LCPs	Local Coastal Partnerships
MHWS	Mean (average) High Water Springs (tides above Chart Datum)
MPP	Marine Planning Partnership
MSODN	Marine Scotland Open Data Network
MSP	Maritime or Marine Spatial Planning
NHTV	Breda University of Applied Sciences
Nm	Nautical miles
NMP	National Marine Plan
NMPi	National Marine Plan Interactive
RMP	Regional Marine Plan
SAMS	Scottish Association for Marine Science
SCF	Scottish Coastal Forum
SNH	Scottish Natural Heritage
SIMCelt	Supporting Implementation of Maritime Spatial Planning in Celtic Seas

About SIMCelt

SIMCelt - Supporting Implementation of Maritime Spatial Planning in the Celtic Seas is a two-year €1.8 million project co-financed by DG Mare and focussed on promoting the development of transnational cooperation to support the implementation of EU Directive 2014/89/EU in the Celtic Seas. Led by University College Cork, the project consortium comprises both planners and researchers from seven partner institutes representing a mix of governmental authorities and academic institutes from Ireland, France and the UK. This consortium is particularly interested in developing meaningful cooperation between neighbouring Member States to support implementation of spatially coherent plans across transboundary zones of the Celtic Seas, building on previous work and leveraging new opportunities to identify and share best practice on technical, scientific and social aspects of transboundary MSP.

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Summary

This report examines the role of 'serious games' as innovative mechanisms for stakeholder engagement in the preliminary stages of preparing a Regional Marine Plan for the Clyde Marine Region in south-west Scotland.

Adapting game technology created between 2011-2016 by a team of Dutch academics and Civil Servants involved in marine spatial planning, the Clyde Case Study tested whether a game environment could create an effective dialogue between marine planning policy experts and stakeholders with an interest in a given marine area. During summer 2017, a series of workshops considered the performance of the Marine Spatial Challenge board game as an innovative method of stakeholder engagement. In early 2018 a bespoke version of the digital MSP Challenge game, created to reflect some of the particular challenges of the Clyde area, was also tested on members of the Clyde Marine Planning Partnership.

In the board game sessions, participants indicated that they became more aware of the issues and influencing factors of MSP, enabling them to understand what marine planning entailed and to better appreciate the views of other sectors represented within the game play scenario. Social learning was noted at the individual level with sustained debate and enthusiasm for marine planning also evident.

Feedback from the digital game also suggested that those already familiar with marine planning as a concept, learned more – at a practical level - about how decisions made in one area had knock-on impacts elsewhere within a sea basin and why communication and joint-working across borders was essential in order to secure overall sustainable Blue Growth initiatives and ecological protection.

These outcomes, coupled with suggestions for incremental improvements, hinted at the potential for wider learning within the broader stakeholder community, both within the Clyde Marine Region and elsewhere across the wider Celtic Seas. It was concluded that, if both games' full deliberative potential could be realised in the future, the process would lead to better-informed decisions in regional marine planning on the Clyde and in other cross-border, transboundary marine planning environments.

Terminology

In Scotland and the wider UK, the presumption is for uses of the marine and coastal environment to take place in combination with each other, unless there is a specific reason why an exclusive or spatial distribution of activity is required. Since a specifically spatial distribution of activities is the exception rather than the rule, UK terminology tends to refer to "marine planning" rather than "Maritime Spatial Planning" or "Marine Spatial Planning" as is more often used within the rest of Europe. However, practical discussion of the discipline amongst EU Member States tends not to differentiate between the two phrases. Throughout this report, therefore, the phrases "marine planning" and "marine or maritime spatial planning" are used interchangeably.

1. Introduction

The Supporting Implementation of Maritime Spatial Planning in the Celtic Seas (SIMCelt) project has tested innovative methods of engagement with stakeholders via a case study set within the Clyde Marine Region on the west coast of Scotland.

It has made use of 'serious gaming', a concept developed in the Netherlands as a way of combining role-play and simulation models to explain complex situations to those with little or no direct previous experience of them. Using the time-honoured technique of 'learning through play', two separate but complimentary approaches utilise a combination of state-of-the-art computer technology and low-tech 'hands-on' equipment to facilitate a greater understanding of ecosystem-based Maritime Spatial Planning.

The concept was first used in 2011, by the Dutch Ministry for Infrastructure and the Environment, as marine planning was put into effect in NL waters in the southern North Sea. In association with the International Game Architecture and Design Team at NHTV University of Applied Sciences in Breda, NL, both the concept and the technology used has been refined and the brand of 'MSP Challenge' has been created. Several editions of the 'MSP Challenge serious games' now exist, each with the purpose of making participants think, talk and interact so they better understand the complexities involved in ecosystem-based Maritime Spatial Planning.

In 2015, the European Commission's Directorate General for Maritime Affairs called for expressions of interest in a project to consider the issues involved in implementing MSP across borders in the Celtic Seas. At the same time, through the Scottish Coastal Forum, the Scottish Government became aware of the MSP Challenge concept and the 'Sea of Colours' digital game that had been developed to aid communication and overcome barriers to cross-border marine planning in the North Sea.

The publication of the Scottish National Marine Plan in 2015 brought into focus transboundary marine planning issues with different jurisdictions at the national borders with England and Northern Ireland and Scotland's international borders with the Republic of Ireland and Norway. Additionally, given that that National Marine Plan was to be complemented by a series of Regional Marine Plans that considered marine-related activities at a subnational scale, the Scottish Government's marine Directorate, Marine Scotland, recognised that facilitating cross-border marine planning *within* these regions was important too. The hypothesis was that marine planning across an administrative boundary caused issues no matter the scale at which it was practiced. Therefore, a project that enabled better communication and understanding in a sub-national context was likely to enable the same outcomes at a national or international level too.

The Scottish Government, therefore, decided to use the opportunity presented by the SIMCelt project to produce something that would benefit marine planning in Scotland and within the wider Celtic Seas area. It was felt that an adaptation of the MSP Challenge computer-based tool offered a novel

approach to stakeholder engagement that could be tested in the new Clyde Marine Region and be used to help inform the creation of a sub-national Marine Plan for the area. Furthermore, the outcomes of the process were likely to have resonance with other SIMCelt Partners as they addressed marine planning in their own areas of jurisdiction and across international boundaries with neighbouring States.

Although the Clyde Case Study was originally intended to create a bespoke version of the existing digital MSP Challenge game for the Clyde Marine Planning Partnership, a low-tech 'board game' edition was developed by Dutch colleagues during the life of the SIMCelt project. This complemented the high-tech approach of the electronic game, which was aimed more at specialist practitioners with some existing knowledge of the subject matter. It offered a 'broad and shallow' approach to explaining ecosystem-based marine planning to a wider group of stakeholders who had little, if any, knowledge of the subject at all.

The board game version was developed in late 2015 and first used to explain ecosystem-based marine planning to an audience of short sea shippers and port operators at a meeting in Amsterdam in February 2016, held under the NL Presidency of the European Council. The Scottish Coastal Forum again brought back the idea of the new game to Marine Scotland and recommended that the Clyde SIMCelt Case Study adapted it to explore the opportunities for engaging with a wider group of less-specialised stakeholders and members of the public whose engagement in the development of a Regional Marine Plan for the Clyde area was required by domestic Scottish marine planning legislation.

Marine Scotland, the Scottish Coastal Forum and the Clyde Marine Planning Partnership, therefore, became a 'First Adaptor' of the board game and its 'hands-on' approach. In much the same way as whisky distillers use their equipment to produce gin as a cash crop whilst waiting for their main product to mature, Marine Scotland and the SCF worked with their Dutch colleagues to produce a version that was used with the Clyde Marine Planning Partnership while the development of the 'Firth of Colours' edition of the digital MSP Challenge game progressed.

This report outlines some key aspects of the use of both of 'MSP Challenge – Clyde Edition' games during the lifetime of the SIMCelt project. It offers some thoughts on the usefulness of the approaches taken to innovative methods of engaging with stakeholders and draws some conclusions about the further impacts that an approach using a 'gaming concept' may have, particularly in the development of the Clyde Regional Marine Plan. By extension, since cross-border and transboundary marine planning is practised at the national and international, as well as the sub-national, level it offers some views about how the approach may be used in these contexts too.

2. Marine planning in Scotland

Marine planning in Scotland is the responsibility of Marine Scotland, the Marine Directorate of the Scottish Government and the marine planning authority for the waters around Scotland. The Marine (Scotland) Act 2010 provides for a system of marine planning for Scottish territorial waters. An agreement with the UK Government gives Marine Scotland powers to plan beyond the 12 nautical mile limit, thus enabling a single Marine Plan to cover the Scottish sea area from the high water mark on land (MHWS) to 200 nautical miles offshore.

The Marine (Scotland) Act requires a National Marine Plan (NMP) to be prepared for Scotland. The Scottish National Marine Plan (NMP) was published and adopted by Scottish Ministers in 2015. As a statutory document, it conforms to the requirements of the UK's Marine Policy Statement and sets out how Scottish Ministers envisage marine resources will be used. The NMP defines clear objectives and provides a range of policies to ensure that marine resources are used sustainably. The NMP applies to all decisions taken by public authorities which affect the marine area.

The Marine (Scotland) Act also enables a system of Regional Marine Plans (RMP) to be established in order to complement the provisions within the National Marine Plan. Responsibility for Regional Marine Planning shall be devolved to a series of Marine Planning Partnerships (MPP) covering discrete geographic areas called Scottish Marine Regions. The first two such Partnerships have been set up in the Shetland and Clyde Marine Regions (Figure 1). They have been directed by Scottish Ministers to create RMPs for those areas and work is under way to engage with key stakeholders and the wider public in order to facilitate the development of such Plans. The Marine Planning Partnerships have a period of three years to develop Regional Marine Plans from the issuing of the Direction from Scottish Ministers.

Marine planning in Scotland is fully in line with the requirements of the EU Maritime Spatial Planning Directive (2014/89/EU), which include public participation to be undertaken and 'land/sea interactions' to be taken into account. For further information on the legislation relating to marine planning in Scotland and the wider UK, see Deliverable 12.1[1] from the SIMCelt Solway Firth case study.

2.1 Participative marine planning at the Regional scale in Scotland

The Scottish National Marine Plan sets the high-level, strategic context for marine planning in Scottish waters out to 200 nautical miles. Through delegated powers from Scottish Ministers, Regional Marine Planning Partnerships are to engage with the "full range of stakeholders and interests" in the preparation of their Regional Marine Plans (Scottish Government, 2015, p.5). It is the duty of such bodies to implement a level of stakeholder engagement in the process of producing Regional Marine Plans. A

[1] Deliverable 12: Sub-component D12.1 - Initial comparison of requirements of, and differences between, primary UK legislation pertinent to marine planning (SIMCelt-C1- C1.2.3 - D12 – D 12.1); Sections 4 & 6.

Statement of Public Participation[2] is required from each Marine Planning Partnership, outlining how this engagement is to be achieved. The Partnership must draw upon the diversity of the area's marine users through participatory techniques, so as to contribute to the fabrication of legitimate policies and to fulfil the requirements set out under national legislation and the EU MSP Directive.

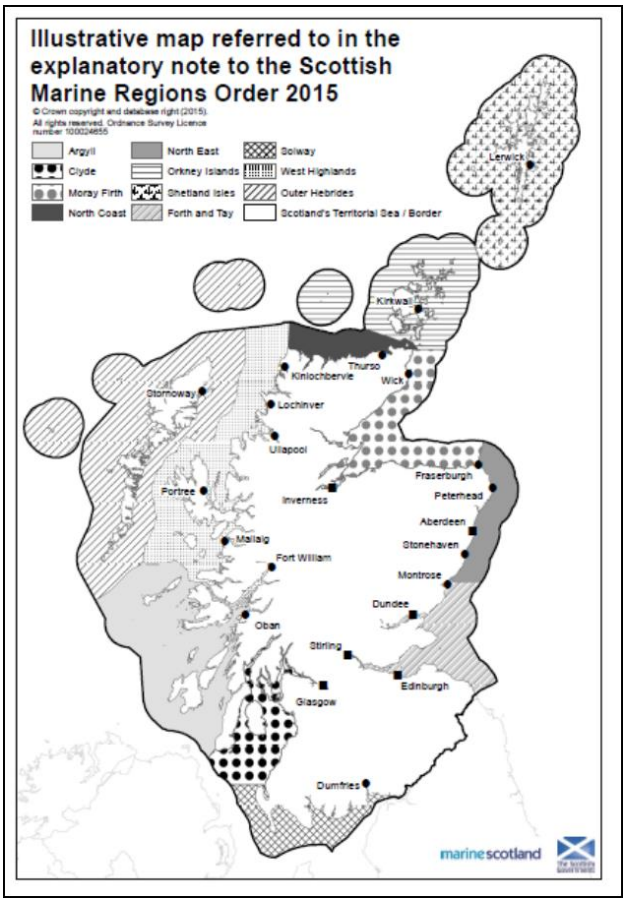

Figure 1: Scottish Marine Regions, 2015

2.2 The Clyde Marine Region and Clyde Marine Planning Partnership

The River Clyde and its wider estuary, or "Firth", is one of Scotland's most iconic waterbodies. The area has a coastline of over 1,200km and includes eight sea lochs, five estuaries and numerous islands. It has long been central to the economy of the west of Scotland and is home to over a quarter of the Scottish population, dispersed amongst large urban conurbations and peripheral coastal communities[3]. The diverse nature of the area largely results from its underlying geology and the subsequent effects of glaciation during the last ice age. The Firth is bisected by the Highland Boundary Fault; the southern part is relatively un-indented and is low in relief whilst the coastline in the northern part is more resistant to

[2] Clyde Marine Planning Partnership Statement of Public Participation http://www.clydemarineplan.scot/wp-content/uploads/2018/01/Clyde-Marine-Plan-Statement-of-Public-Participation.pdf

[3] Estimates of populations in the eight Local Authority areas surrounding the Clyde in 2016, from the Office of National Statistics https://www.nomisweb.co.uk/,

erosion, resulting in a more indented and dramatic landscape. Dredging of the Clyde's naturally shallow waters allowed the movement of commercial traffic up into Glasgow city centre, which facilitated the industrial boom associated with the Clyde from the 18th century onwards. While both traditional heavy industries and associated contaminant input have declined in recent years, there is a post-industrial legacy of metals, oils and sewage contamination affecting the sediments, water column and biota (Clyde Marine Region Assessment 2017, page 13).

In the early 1990s, the model for Scottish local government changed from large Regions to smaller Local Authorities with greater autonomy for their actions. Around the Clyde, Strathclyde Regional Council gave way to eight new Councils each of which had some level of connection to the river. This coincided with the rise of Integrated Coastal Zone Management as a way of working with multiple stakeholders to secure a more integrated approach to the use and management of activities on and around coastal areas. In the UK, the statutory nature conservation agencies, English Nature and Scottish Natural Heritage, funded the development of Partnerships dedicated to ICZM. In Scotland, the first Local Coastal Partnerships focused on four of the main estuaries: the Solway Firth, the Moray Firth, the Firth of Tay and the Firth of Forth. Around the same time, the new local authorities around the Clyde came together, with backing from Scottish Natural Heritage, to create the Firth of Clyde Forum as the Local Coastal Partnership for the Clyde area.

For over 20 years from around 1994, the Firth of Clyde Forum facilitated greater awareness of the resources around the area and the many pressures on them from different sources. In 2006 the Clyde was selected as one of the pilot areas for the Scottish Sustainable Marine Environment Initiative (SSMEI), which looked at different options for non-statutory marine planning. At the same time, the Scottish Government was taking evidence from marine and coastal stakeholders[4] that suggested the existing *ad hoc* approach to the management of Scottish offshore resources were no longer fit for purpose and recommended new legislation. In 2008, the Scottish Government decided to pursue dedicated legislation for marine planning. This chimed with the UK-wide approach towards setting up processes for formal marine planning, which had been gathering pace since 2005.

The Marine (Scotland) Act requires the publication of a National Marine Plan for Scotland and enables Regional Marine Plans to be created, to be developed by Marine Planning Partnerships, following a Direction from Scottish Ministers. There is no single model for how a Marine Planning Partnership might operate but in February 2016 the Firth of Clyde Forum ceased to exist as a non-statutory Local Coastal Partnership focused on Integrated Coastal Management and re-emerged as the Clyde Marine Planning Partnership (CMPP). The CMPP received its Direction for marine planning within the Clyde Marine Region in March 2017 and has until March 2020 to produce a Regional Marine Plan for the area.

[4] The Advisory Group on Marine and Coastal Strategy (AGMACS): see http://wayback.archive-it.org/3011/20130201190757/http://scotland.gov.uk/Topics/marine/seamanagement/marineact/16440

The Scottish Local Coastal Partnerships have a long history of carrying out stakeholder engagement on projects within their areas and for being a conduit for Government consultations on new policies, such as the development of marine planning legislation. This way of capturing input from a wide variety of sources is greatly valued by the Scottish Government, which has financially supported the LCPs since funding from Scottish Natural Heritage came to an end in 2010. Stakeholder consultation and engagement is a core aspect of all Scottish Government policy making, not only in matters relating to coastal and marine issues. Increasingly, however, it became obvious that despite the a considerable amount of experience in stakeholder engagement from the previous work of the Firth of Clyde Forum and other Local Coastal Partnerships, something new might be needed to explain the complexities of marine planning for the development of statutory Regional Marine Plans.

2.3 The SIMCelt Clyde case study

The SIMCelt project undertook to test innovative and novel methods of stakeholder engagement in areas of cross-border and transboundary marine planning. The main focus of such an approach may have been expected to be a sea area shared by multiple countries, e.g. the Irish Sea. However, the absence of SIMCelt Partner organisations from Wales and England meant that a comprehensive case study involving the three EU Member States would be difficult to achieve within the timescale available. A project based on the Irish Sea would also have had to consider the different stages of marine planning around the sea area, not only between the three countries but also between different administrations within the United Kingdom. The Scottish Government published the National Marine Plan for Scotland in 2015 but the English Marine Management Organisation does not expect to complete Marine Plans for the Inshore and Offshore Areas for the south-west and north-west of England until 2020/21 and the Marine Plans for Wales and Northern Ireland are still in draft form in early 2018.[5]

A case study at a sub-national level was anticipated to achieve specific benefits for the Clyde Marine Planning Partnership and the rolling-out of Regional Marine Planning in the Scottish context. It was also considered likely to result in lessons that could be applicable at other scales of cross-border interaction, elsewhere in the Celtic Seas area and across Europe. Marine Scotland, aided by the Scottish Coastal Forum which had developed direct links with the developers of the MSP Challenge games, therefore, took the decision to invest in this approach and learn about the outcomes for planning across borders at a level that facilitated its real-life marine planning operations. The Clyde Marine Planning Partnership was offered the MSP Challenge game approach as a pilot project to initiate the process of developing a dialogue between policy experts, regulators, decision-makers and marine users.

[5] Draft Wales National Marine Plan published for consultation on 7 December 2017: see https://consultations.gov.wales/consultations/draft-welsh-national-marine-plan. The draft Northern Ireland Marine Plan is anticipated to be published for consultation during 2018.

3. MSP Challenge: Building a community through gaming

In his seminal book 'Gaming: the future's language', Richard Duke explored the relationship between language, complex systems and gaming. He argued that humankind thinks in images, in a *gestalt,* but communicates with others in a sequential string of component descriptions. This works well for linear and straightforward communication but not for when communications about complex systems are required (Duke, 1974 quoted in 'Does the helmsman speak English?", Abspoel et al, 2017, unpublished paper for 'Marine Policy'). For Duke, 'a game is worth a thousand pictures'. Playing games is a spontaneous solution, utilised in many situations from early childhood onwards, to learn about complex systems. Marine planning is the latest in a long line of subjects to use this process for its own ends, embracing the theory that gaming creates a language that is able to effectively communicate complex processes in an engaging and enjoyable manner.

The development of such methodologies is viewed as a necessary step in the direction towards better management of shared marine environments, the argument being that methods of stakeholder engagement have to be wide-ranging and innovative due to the intricacies of coordinating and delivering marine planning/ maritime spatial planning (Pomeroy and Douvere, 2008). In Article 9 of the EU Maritime Spatial Planning Directive[6], the requirement for public participation in developing marine plans, in accordance with relevant provisions established in Union legislation, is clearly set out. The SIMCelt Clyde case study was designed to test this concept in the context of cross-border marine planning within an area already covered by a national Marine Plan but where a Regional Marine Plan is required to be developed to complement that national approach within a three year period.

3.1 MSP Challenge – an overview

During 2011, the Dutch Ministry for Infrastructure and the Environment was looking for a way of explaining MSP to its stakeholders as work progressed on the Dutch National Marine Plan and the importance of working with neighbours in the southern North Sea to effect positive outcomes across borders became evident. Through the personal interest of one of their Senior Maritime Policy Advisors, the NL Government joined up with a team of academics at Breda University of Applied Sciences to develop a game-based approach towards Maritime Spatial Planning. This had the dual role of educating participants in the complex concept of ecosystem-based marine planning and also raised awareness of the knock-on impacts, over time, of planning decisions made for the marine environment.

The original MSP Challenge digital game[7] was inspired by commercially-available computer-based, role-playing simulation games and was designed to take advantage of developments in digital technology,

[6] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0089&from=EN
[7] http://www.mspchallenge.info/msp-challenge-original-2011.html

software capabilities and graphics that made the resulting tool easily portable and accessible to all. Since 2011, several editions of the digital game have been developed to complement and service the expanding need for a mechanism to engage with stakeholders at all levels of interest and encourage them to participate in the marine planning process. A 'board game' version has also been produced to offer a low-tech, hands-on approach to understanding marine planning.

All versions of the MSP Challenge games make players think, talk and interact. Since 2011, hundreds of people from dozens of countries in Europe and elsewhere have played one or more of the editions. The process has been successful in connecting a large number of institutions, practitioners, participants and planners, which has built a MSP community and contributed towards the development of a common language and understanding of the practicalities of marine planning.

3.2 MSP Challenge digital game – the 'Sea of Colours'

The original MSP Challenge digital game used the real-life experiences of Norway, Denmark, Sweden and Germany as its starting point. It featured a standalone database installed on the players' own laptops, with map layers and geo-information derived from and inspired by the Kattegat-Skagerrak area, north of Denmark, and the Baltic Sea. The aim was to develop a planned approach for marine activities *but* with a twist: not all of the players had access to all of the data. Each role had a unique code to unlock certain data: sharing information and knowledge, therefore, had to be negotiated.

This version, featured four countries – Red, Blue, Green and Yellow – located around a single shared sea area known as the 'Sea of Colours'. It put would-be marine planners in charge of the process of making a marine spatial plan for that area. Stakeholders (businesses and environmental NGOs) had to ensure that their spatial claims were included in the marine spatial plan while policy analysts/ scientists were dedicated to analysing the problems and enabling the flow of information and knowledge between interests to facilitate good decisions to be made for both national and international interests. The objective was to significantly contribute to policy learning and international planning practices with regard to integrated (ecosystem-based) Marine Spatial Planning.

The original MSP Challenge was designed for the 2011 HELCOM/VASAB, OSPAR and ICES workshop on Maritime Spatial Planning held at the Marine Aquarium in Lisbon. This event brought together around a hundred MSP professionals, mainly from Europe, and the game proved to be a great success in terms of engagement, appreciation and sharing of knowledge (Mayer et al., 2012, 2013; Zhou, 2014).

3.3 MSP Challenge - North Sea 2050 edition

A second digital version of MSP Challenge was created in 2013[8], building on the lessons learned from the original edition. This game focussed more on planning and transboundary co-ordination among six countries around a representation of the North Sea. It challenged players to achieve Good Environmental Status and a prosperous blue economy for their country by using Marine/Maritime Spatial Planning instruments and keeping in mind European guidelines and international consultation.

The flexibility of the game was significantly improved so that a session could be run in a shorter time and with fewer players. The most important innovation was the development of a simulation model so that the impacts of player's decisions over time (2015-2050) could be demonstrated. Improvements in computer graphics also allowed for better on-screen visualisation of birds, port infrastructure, vessel traffic and wind turbines, which in turn led to a more immersive experience for participants.

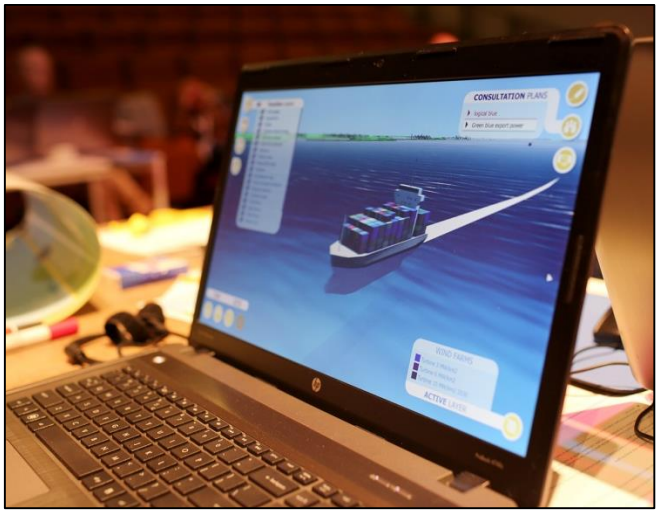

Figure 2: Example of 2.5D computer graphic of cargo vessel from MSP Challenge 2050 edition (2015)

3.4 Digital game platform editions

In 2015, further opportunities to develop MSP Challenge came from three EU-funded projects: NorthSEE (2015-18), BalticLINES (2015-17) and SIMCelt (2015-18). Each recognised the game-based approach as a flexible tool for promoting stakeholder engagement in marine planning for very different European sea areas. As discussed earlier, the SIMCelt project allowed Marine Scotland to engage the International Game Architecture and Design Team at NHTV Breda University, as custodians of the technical development, to develop a bespoke digital edition for the Clyde Marine Region. This has included incorporating the ecological modelling tool, Ecopath with Ecoism (EwE), so that the game

[8] http://www.mspchallenge.info/msp-challenge-2050-2013.html

platform can directly calculate and represent in a visual format the impacts of human activities such as shipping and offshore energy generation on ecosystems over time (see Section 6).

Technological developments also mean that the Clyde version has tested the capacity of direct links to web-based geodata services in the respective areas, so that data from multiple sources can go into the game in a cost-effective manner. As a result, the platform will be able to be developed for many other marine regions in the world, continuing to build an interactive MSP community.

3.5 MSP Challenge - Board game edition

The MSP Challenge board game is a table-top strategy game, using a graphic representation of a fictitious shared sea basin and role-play to allow players to plan for the development of marine-related activities in national and shared international marine waters through the spatial allocation of economic functions and ecological features (Keijser et al., 2017). It was developed in the Netherlands in late 2015 by a small team of game developers, designers and MSP experts and was first played with stakeholders at a high-level meeting on Short Sea Shipping, held in Amsterdam as part of the Netherlands' EU Presidency. The aim was to let players experience some of the dynamic and complex interactions between Short Sea Shipping and MSP as they sought to achieve both Blue Growth and Good Environmental Status in their 'own' waters and in the international waters of the shared sea basin.

Although originally intended to be a one-off workshop session within a Short Sea Shipping event, the simplicity of the game offered itself to adaptation for many other aspects of stakeholder involvement. In particular, it was a low-tech but powerful tool for engaging with a wider range and greater diversity of people who are (or should be) connected to marine planning. The concept lent itself very well to the development of a Scottish Regional Marine Plan, with an explicit requirement to have more general public participation as well as involvement from stakeholders with some understanding of marine planning. As a result, the SIMCelt Clyde case study was an early adapter, and adopter, of the MSP Challenge board game concept. It has proven to be an effective educational tool that provided an entry-level understanding of a complex process in a fun and absorbing manner.

The MSP challenge board game is played on a 2.8 x 1.6m plywood game board, printed with a map of the fictional Rica Sea[9], which is bordered by three geographic areas – Island, Bayland and Peninsuland. Black and white dotted lines give indications of boundaries between the three areas on land and in coastal waters but are left deliberately vague further offshore. The map is covered by a grid with holes drilled through the middle of each of the 1,440 squares. Many colourful acrylate tiles, with various symbols for the marine environment and human activities, are designed to fit exactly onto the grid

[9] 'Rica' is used by permission of the European Parliament's InterGroup on Rivers, Islands & Coastal Areas, convened by Gesine Meissner MEP.

squares in order to build up the picture of ecosystem services and human activities above, on and below the sea surface. These tiles are held in place by small spikes, which allow several to be piled up on top of each other indicating different activities taking place in the same area and usefully illustrating the concept of 'co-location'. Threads tied around the spikes are used to indicate shipping routes for ferries, fishing boats, cargo ships, cruise liners and offshore energy support vessels. Pipelines, communication cables and electricity cables are also included, giving a three-dimensional representation of the many activities that make use of the sea bed, surface and water column.

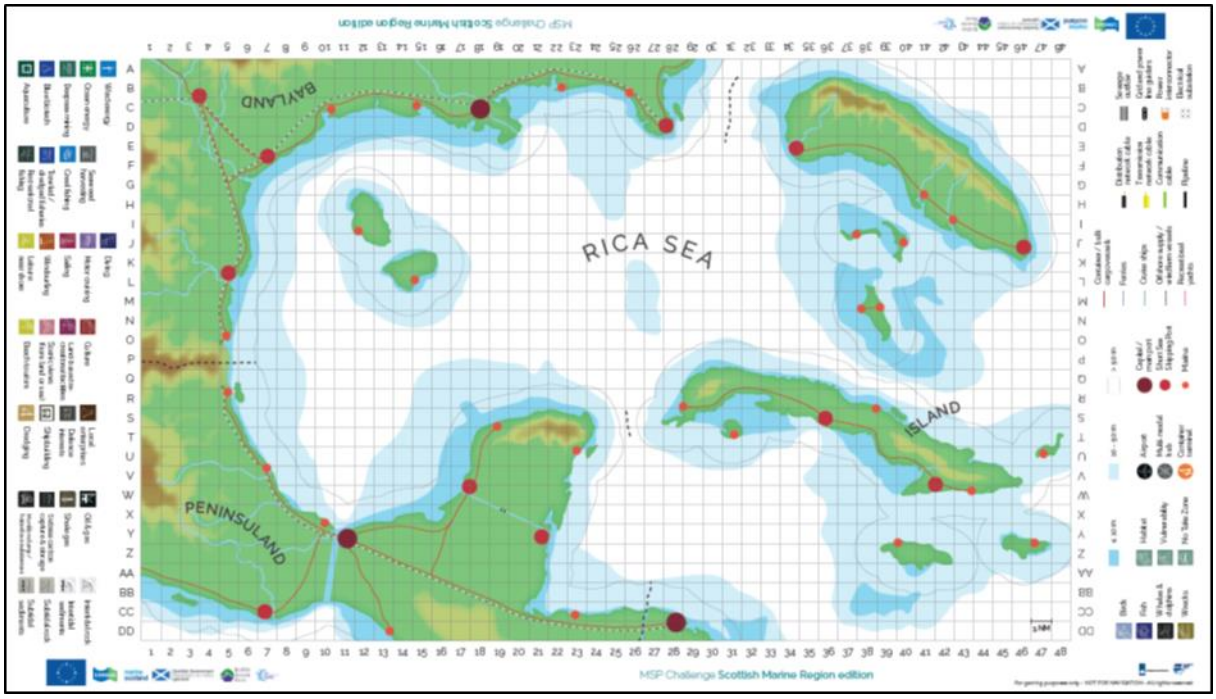

Figure 3 – the Rica Sea game board, as configured for the Scottish Marine Region edition

Supporting information is provided to players to set the context and facilitate an understanding of the issues within the Rica Sea. Legends explain the stylised symbols on the tiles and tokens and which colour of thread relates to which class of vessel. Some background details are given on the different economic and ecological priorities of the three administrative areas and a set of five 'Opportunity Maps' outline where different resources might be found within the Rica Sea. These include fisheries, sensitive habitats and species, oil and gas deposits, areas for marine recreation and wind energy. Examples of the background and supporting information adapted for the Clyde Marine Region edition is given in Annex 1.

The Game Overall Director (GOD), who is a MSP policy expert, sets up the board prior to players arriving. Tiles and threads show the spatial distribution of a few activities around the map, e.g. ports, wind farms, cultural sites and areas for habitats and species. The way in which tiles and threads are set up on the map varies with every game. If a site that is marked on the map as being a centre of population or a possible port but does not have the appropriate token held in place by a spike at the start of the game, it means that it is currently undeveloped but could be developed in due course.

There is no 'right' or 'wrong' way of creating a starting set up: it is entirely up to the Game Overall Director and the scenario that is being played. The flexibility of the equipment means that scenarios are only constrained by the limits of the imagination of those running the sessions.

3.6 MSP Challenge board game – the Scottish Marine Region edition

Work to adapt the graphics and materials of the original Short Sea Shipping board game for the Clyde Marine Region took place between March and July 2016. The map on the board remained the same but the scale varies in different versions. The Short Sea Shipping edition is based on international waters and each square represented 15 x 15 nautical miles. For the Clyde Marine Region edition to successfully represent a sub-national sea basin, the distance was rescaled so that each square was 3 x 3 nm.

The Clyde Marine Planning Partnership was consulted about additional features that would be relevant to the Clyde area. New tiles were requested to represent habitats found within the area, such as intertidal and subtidal sediments and rocks. Other icons were developed to represent emerging uses of marine resources, such as seaweed harvesting, and to address aspects of Blue Economy, such as the icon of a whisky still to signify Local Enterprise.

Figure 4 – tiles and icons created for the Scottish Marine Region MSP Challenge board game

Tiles represent: intertidal & subtidal rocks, intertidal & subtidal sediments, creel fishing, seaweed harvesting, protected habitats, vulnerable habitats, No Take Zones, blue biotech opportunities, beach tourism, land-based recreational activities, near-shore leisure activities, local enterprise and munitions dumps

The underlying scenario for marine planning was amended to mirror the actual Scottish situation. The Rica Sea is a Marine Region within Terra Rica, a country with considerable marine assets and productive and diverse coastal and offshore areas. It is bordered by three local authorities – Bayland, Peninsuland and Island Councils. The areas have a shared maritime heritage but different ideas for the future development and protection of the Sea's resources. Some objectives compete with those of other areas but all are subject to the overarching policies contained within the country's strategic National Marine Plan. The Terra Rica National Marine Plan contains general, cross-cutting policies that relate to all activities as well as some policies that relate to specific sectoral interests, e.g. aquaculture, ports and shipping or marine-related tourism and recreation. There is a presumption that 'land/sea interactions' will be taken into account during the process of deciding where activities can develop, benefitting both the Blue Economy and marine nature conservation.

3.7 Playing the MSP Challenge board game

Players are divided into three teams of up to ten, allowing a range of marine interests and economic sectors to be represented in each Local Authority area. Not every area has exactly the same industries but each should have its own Marine Planner who has to balance the competing demands of fellow participants against local and national objectives for economic development and environmental protection. Ideally, each area should also have its own Nature Conservation Advisor who is able to consider the environmental aspects of proposed developments and remind players that they are pursuing an **ecosystem-based** approach for marine planning. The three local authorities are challenged to plan their shared uses of the sea by allocating functions to marine space.

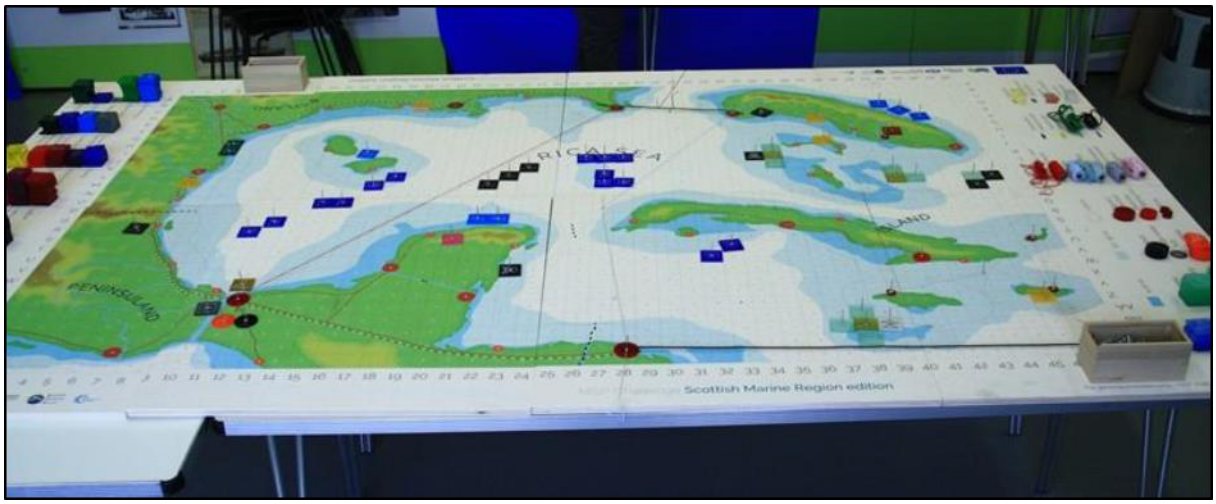

Figure 5: Game board set up to begin playing: some activities evident around Rica Sea area

Participants are given free rein to develop their interests to reflect the economic, environmental or social objectives of their own area but can be confronted with an array of opposing interests. Ideas and proposals may compete with each other for space, which should start them talking and thinking about the interrelations between different objectives in areas of shared sea space along with the effects that development in one area may have on another. Opportunities for combining activities for synergistic and beneficial outcomes that overcome conflicts of interest across administrative boundaries may arise.

Depending on numbers and the scenario under consideration, some strategic roles can be used to help shape the play: e.g. the Queens Harbour Master who is in charge of defence interests and, ultimately, all shipping movements around the area; a National Advisor on marine nature conservation or a Strategic Developer of offshore renewable energy. The combination of strategic and local roles gives an additional dynamic to the negotiations within the game.

Figure 6: Tiles and threads demonstrating spatial uses made of land, coastal areas and offshore waters with some areas of multiple uses evident

Figure 7: Examples of roles to be played by those in Peninsuland

Different scenarios can be invented to test particular aspects of marine planning. Early versions of the game only had a few basic rules and participants, having been allocated roles to play, were simply invited to jointly develop the Rica Sea so that at the end of the session they were comfortable with the state of the sea area and how it was being used. Over time, some structure was introduced so that players had a goal to work towards, such as the installation of offshore renewable energy infrastructure or the development of marine-related tourism opportunities. .

Participants interact with each other, bringing their own experiences and interests to the board and engaging in the motions of conflict and decision-making. By so doing, they gain an understanding of the inherent complexities and influences exerted during the marine spatial planning process. At the end of a session, they are often better able to understand, or at least recognise the validity of, the viewpoints of other interests. This is especially the case when players are asked to take on a role outside their normal experience; one of the most illuminating moments came from a participant after he was asked to play the role of a mobile fisheries interest instead of representing his normal marine recreational remit. "Now I understand why fishermen think that sailors get in their way!" he commented[10].

The end of the exercise produces no winners or losers *per se* but some scenarios may require a certain number of squares to be dedicated to given activities,, e.g. for offshore energy generation or Marine Protected Areas. The Game Overall Director can establish whether this was achieved or not. The participants may also be asked for their views on whether they thought a specific outcome was successfully delivered as part of the feedback gathered on conclusion of play.

[10] Feedback from Graham Russell, Royal Yachting Association (Scotland) on playing the MSP Challenge game at the Scottish Coastal Forum's 20th Anniversary conference, 10 March 2016.

4. Handover events

4.1 SIMCelt MSP Challenge workshop at EU Atlantic Strategy conference, September 2016

Marine Scotland took possession of their first set of game boards in September 2016 and staff facilitated a session, in tandem with the Dutch inventors, as a workshop for the EU Atlantic Action Plan and Strategy Stakeholder Platform conference in Dublin, Ireland. The original Short Sea Shipping edition was set up next to the new Scottish Marine Region edition and the two games were played side-by-side. The shipping game, looking at transnational issues in marine planning, made an interesting contrast to the sub-national approach of the Scottish game.

Figure 8: Prof. Igor Mayer of NHTV introduces the MSP Challenge board games to delegates at the EU Atlantic Strategy Stakeholder Platform event in Dublin on 27 September 2016

The two boards and the 'hands-on' experience captured the imagination of the delegates, many of whom were already engaged in their own countries' development of marine planning to satisfy the requirements of the EU MSP Directive. Delegates from the five EU Atlantic seaboard countries – the UK, Ireland, France, Spain and Portugal – participated in intense but good-natured discussions as the players quickly got to grips with the threads and tiles and started to develop Blue Growth opportunities within the sea basins. These games were played with very little instruction apart from explaining the different scales involved and a general exhortation to communicate across the boundaries to jointly develop and protect the Rica Sea area. The Short Sea Shipping game proved very popular with would-be shipping magnates intent on developing trade routes between the three countries around the Rica Sea but realising that they needed to work with colleagues in port operations to facilitate the necessary land/sea interactions. Nature Conservation interests were vociferously represented but not always heeded. We have since learned that this is a common outcome in almost all game sessions! The sub-national game clearly resulted in a greater range of activities distributed throughout coastal and offshore waters than its counterpart.

This was a learning experience for all but messages posted on social media, including by Karmenu Vella, the European Commissioner for Environment, Maritime Affairs and Fisheries, suggested it had been an extremely enjoyable and useful one.

Figure 9: Positive social media feedback from EU Atlantic Strategy MSP Challenge workshop in Dublin, 27 September 2016

4.2 Glasgow University students at Millport, Firth of Clyde, October 2016

Following the success of the Dublin event, a further handover/training session with the Scottish board game took place in October 2016 at the Field Studies Council marine laboratory on Millport, an island in the middle of the Firth of Clyde. Freshwater Biology undergraduate students from Glasgow University participated and Clyde Marine Planning Partnership staff learned from Dutch colleagues how to successfully facilitate and run a game.

This event contributed to a greater understanding of the time and resources required for organising and delivering a session along with what the game could deliver in terms of a 'broad but shallow' introduction to marine spatial planning and an idea of the outcomes that could be expected from participants in a limited period of time. Feedback from the students enabled further refinements to be made and facilitators realised that some participants needed greater encouragement and explanation of the roles and possible connections between activities. Eventually, this led to a summary of positive and negative interactions with other sectors and interests being printed and stuck on the reverse side of the role play lanyards as a useful *aide-memoire*.

5. Use of the MSP Challenge board game in the Clyde Marine Region

Developing a Regional Marine Plan (RMP) for the Clyde area will take place over a three year period and will entail a number of discrete stages. Input from stakeholders and the public is recognised as being a core attribute of the process so that the RMP is drafted with the benefit of local opinion from a wide community of interests. The published Statement of Public Participation (SPP) outlines key periods of time in the plan development process and ways that people can get involved.[11]

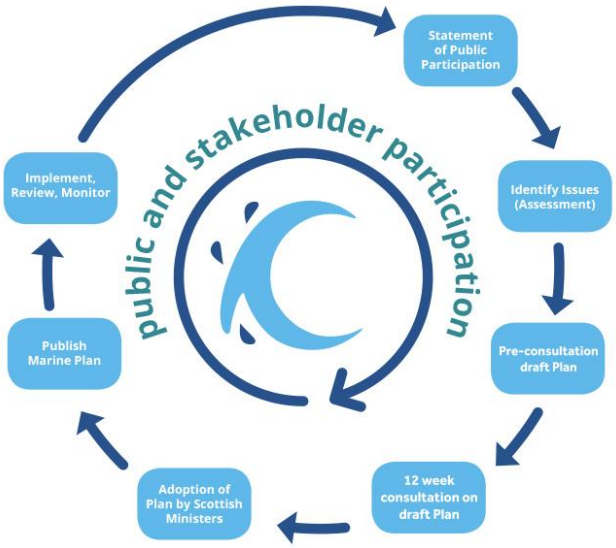

Figure 10: Clyde Marine Planning Partnership's process of Regional Marine Plan development

An unexpected delay in the issuing of the Direction from Scottish Ministers to the CMPP to undertake marine planning within the Clyde Marine Region resulted in a hiatus in late 2016/early 2017 and the board game was not immediately utilised as had been envisaged. The CMPP did not wish to start the process of public participation and stakeholder engagement without the Direction from Scottish Ministers in place. This was finally issued in March 2017 and coincided with an expression of interest from an Aberdeen University M.Sc. student to work as a summer intern with the CMPP.

The draft Statement of Public Participation (2016) scheduled a number of MSP Challenge sessions during 2017 to test the board game as a novel method of stakeholder engagement and to see whether it lived up to its potential for facilitating an understanding of marine planning as a process. A programme was devised where the student was able to work with staff from the CMPP, Marine Scotland, and the Scottish Coastal Forum to observe, participate and run sessions to gather raw data for his dissertation and for the SIMCelt project. As an introduction to the game, he took part in a session organised by the University of Liverpool's Planning School, which had purchased its own version of the board game in early 2017 for use as a teaching aid for Marine Planning students.

[11] http://www.clydemarineplan.scot/about-us/about-the-clyde-marine-planning-partnership/

5.1 Clyde Stakeholder Engagement Workshops

In May and July 2017, after the Direction had been issued, the MSP Challenge approach was incorporated into the CMPP's Statement of Public Participation[12] and six sessions were arranged where the MSP Challenge board game was played 'for real' around the Clyde Marine Region. The locations were chosen to provide geographic coverage across the area, beyond the main centres of population, and with the firm intention of taking the MSP Challenge game *to* stakeholders in their own communities. The decision was also taken to gain a more representative cross-section of those with an interest in how the Clyde is used. In particular, non-sailing marine recreation pursuits were targeted in order to counteract the historic under-representation of divers, kayakers, canoeists, coastal swimmers and rowers in stakeholder engagement within the context of the Clyde.

The first three sessions were 'trial runs' and gave valuable feedback on how best to advertise, organise and deliver the stakeholder engagement sessions. The latter three benefitted from this trial period were the ones whose results were analysed in greater detail and formed the basis of the M.Sc. dissertation "Using Serious Gaming in Regional Marine Planning: An Innovative Stakeholder Engagement Pilot Project in the Clyde Marine Region".

Figure 11: Locations of the Clyde MSP Challenge game workshops, May & July 2017

[12] http://www.clydemarineplan.scot/marine-planning/clyde-regional-marine-plan/

5.2 Stakeholder workshops – May 2017

The three events held in May 2017 introduced the MSP Challenge game to residents of two peripheral coastal communities to the north of the Clyde Marine Area (Lochgilphead and Arrochar, near Inverary) as well as the larger urban conurbation of Greenock on the south bank. The sessions were advertised via the Clyde Marine Planning Partnership's website and using social media feeds in an attempt to get away from simply emailing those who had previously participated in Clyde-related events organised by the Marine Planning Partnership or its predecessor body, the Firth of Clyde Forum. This method had some success in attracting new participants but numbers were low in all three events and changes were made to the advertising approach before the July sessions.

Although post-game questionnaires were completed by the participants, no formal statistical analysis on the results was carried out. However, the feedback from the questionnaires, coupled with observations made during the game sessions, provided a useful base from which to refine the approach that would be taken in July.

Since numbers were low (not exceeding ten in any session), the roles were played at the strategic level and each participant was responsible for their activity across the whole sea basin. This worked particularly well for strategic considerations such as shipping, fishing interests and nature conservation advice. A 'Community Representative' was also introduced, who (although a single person) managed to invent plausible community reactions from each geographic area to the proposals affecting their interests. In one notable case, a new ferry route joining Island to the mainland was objected to until a deal was brokered where it was agreed that there would be no sailings on Sundays, thus allowing for traditional observations of the Sabbath to be maintained. This demonstrated that it is not just economic or environmental aspects that have to be considered as part of marine planning.

From the questionnaire feedback, the majority of participants either agreed or strongly agreed that the game:

- was easy to learn to play
- enjoyable
- represented the challenges associated with marine planning/MSP.

Further, the majority also agreed or strongly agreed that they:

- better understood what marine planning/MSP is
- could better imagine the different viewpoints represented as part of the MSP process
- gained more insight to the important factors in MSP and how they can influence each other
- were likely to recommend the game to others.

For the organisers, the very first session was a baptism of fire. This was played with a small group of local business representatives, a Local Government Planning professional and those for whom marine nature conservation is a passion. Initial suspicion of the purpose of the game was difficult to overcome because of a pervasive sense amongst some of not having been previously listened to by Government in relation to marine issues. However, dogged determinism to engage with the points of view being put across and to encourage players to use their real-life experiences in the representation of their interest eventually led to positive support for the game by the end of the session. This event gave the organisers much to think about and a re-evaluation of the approach was undertaken before the next session. Subsequent events ran more smoothly because a number of key points were better explained during the introduction and set-up. A comment from the last game gave an indication that the board game was beginning to fulfil its potential: "I now fully understand the complexity of the planning work involved!"

Figure 12: Participants from the Arrochar, Greenock and Lochgilphead sessions considering options for ecosystem-based marine planning – May 2017

5.3 Stakeholder workshops – July 2017

The results of the three stakeholder engagement workshops held in July 2017 focus on two aspects of research: facilitator observations of the types of negotiations and/or conflicts between players, and the results from ranked questions from an end-of-session questionnaire. The combination of these two criteria informed an assessment of the stakeholder engagement experience, gauging whether the game stimulated increased learning of MSP issues amongst participants.[13]

5.4 Game-play observations

The observed negotiations were based on the following criteria:

1) whether discussions occurred between players within the same team (i.e. 'domestic' negotiations taking place within a single geographic area);
2) whether discussions occurred between players from two different teams (i.e. 2-way interactions taking place over an administrative boundary), and;

3) whether discussions occurred between all three teams (i.e. 3-way transboundary interactions).

Tables 1–3 illustrate the results from observations recording these three types of negotiations as the sessions progressed. With varying participant numbers across each workshop, no two sessions were the same and each yielded slight variations of the types of negotiations undertaken. With smaller numbers, participants in Workshops 1 and 2 were inclined to engage in two-way negotiations immediately. With the greatest number of participants, Workshop 3 displayed only domestic negotiations in the initial stages, but showed a gradual progression to two-way as the session continued.

The most notable result was the complete lack of three-way transboundary negotiations at any stage across the three workshops despite players being urged to do so before the sessions. This was viewed as a game-play design issue, with some players suggesting stricter rules on discussions should be enforced by the Game Directors. Despite this being a major challenge, the game nevertheless stimulated in-depth discussions revolving around a variety of sectoral interactions.

[13] Paris, C. 2017. Using serious games in Regional Marine Planning: An innovative Stakeholder Engagement Pilot Project in the Clyde Marine Region – A thesis presented in partial fulfilment of the requirements for the degree of MSc in Environmental Partnership Management at the University of Aberdeen.

Table 1: Negotiation-by-time Matrix (Workshop 1, July 2017, n = 7)

	Observed Negotiation		
Stage of Game-play	Domestic Only	Two-way Transboundary	Three-way Transboundary
Initial Stages (First quarter)	**No**	**Yes** ✓ ✓	**No**
Second Quarter (Before Interval)	**Yes** ✓ ✓	**Yes** ✓ ✓ ✓ X	**No**
Second half session (After interval)	**Yes** ✓	**Yes** ✓ ✓	**No**

Table 2: Negotiation-by-time Matrix (Workshop 2, July 2017, n = 10)

	Observed Negotiation		
Stage of Game-play	Domestic Only	Two-way Transboundary	Three-way Transboundary
Initial Stages (e.g. beginning)	**Yes** ✓ ✓ ✓	**Yes** ✓	**No**
Throughout first half session	**Yes** ✓ ✓ X X X	**Yes** ✓ ✓ ✓ X X X	**No**
After half-way interval	**Yes** ✓	**Yes** ✓	**No**

Table 3: Negotiation-by-time Matrix (Workshop 3, July 2017, n = 19)

	Observed Negotiation		
Stage of Game-play	Domestic Only	Two-way Transboundary	Three-way Transboundary
Initial Stages (e.g. beginning)	**Yes** ✓ ✓ X X	**No**	**No**
Throughout first half	**Yes** ✓ X X	**Yes** ✓ X X	**No**
Second half (no interval)	**Yes** ✓ X	**Yes** ✓ X X	**No**

Note: Orange - domestic vision/strategy observed, i.e. negotiation only within team

Blue – two-way vision/strategy observed, i.e. negotiation between members from two different teams

Green – three-way vision/strategy observed. i.e. negotiation between members from all three teams

✓ - individual observed negotiations **X - individual observed conflicts**

Table 4: Descriptions of individual observed negotiations

Workshop	Type of Negotiation/ Conflict	Description
Workshop 1	Two-way negotiation	Peninsuland's Marine Planner (MP) engaged in negotiations with Bayland's MP and Local Enterprise (LE) representative regarding developing connections from Peninsuland's main port to the small islands within Bayland. The discussion highlighted the potential for tourism opportunities on these islands, which was perceived to bring benefits to both Local Authorities (LAs). This two-way transboundary discussion showed "vision" for potential development, represented by the blue shading in Table 1, and carried into the second quarter of the session.
	Conflict	Only one major conflict was observed regarding the proposal, discussed above. The Nature Conservation Advisor (NCA), who was not involved in initial discussions about the development of the ferry route, flagged concerns about the potential disturbance to fish stocks after the route's completion. The Peninsuland MP, although maintaining that the ferry route should have had priority over fishing fleets, altered the route in accordance with the NCA's views and advice.
Workshop 2	Domestic Conflict leading to Two-way Negotiation	The Island Marine Planner and Nature Conservation Advisor were negotiating with the Island Shipper, who planned to introduce new ferry routes between the islands to increase connectivity. The proposal was rejected because of the potential disturbance to sensitive habitats. However, this set-back encouraged the Island Shipper to engage in two-way transboundary negotiations with Peninsuland's Port Operator and Mobile Fisheries representative regarding a route connecting to the main port in Peninsuland. Issues included the avoidance of whales and fishing grounds, both incurring additional costs to the Shipper. The Shipper added that ferries would only run twice a day to reduce impact and it was decided to accept the altered route as its benefits, including increased connectivity to populated mainland areas allowing better access for visitors and additional tourism revenue, outweighed the costs.

Workshop 3	Two-way Negotiation but with possibility of Three-way "Vision"	In the final stages of the last workshop the first three-way transboundary "vision" was observed. Peninsuland's Local Enterprise representative approached Island's Shipper about new ferry links from Peninsuland to Island, establishing a golf-themed trail around the map. The Shipper argued whether the ferry route would be justifiable if used only by golfers but it was concluded that many other users would benefit from the route, including the Island community, and the development was agreed. This, however, was noted only as a two-way transboundary negotiation with "three-way vision", as the involvement of the Bayland LE representative in these plans was uncertain.

5.5 Questionnaire Responses

The targeted marine recreation audience revealed a low level of involvement in MSP which was thought to give greater scope for learning. To this end, the overall response from across all three events (n = 36) showed positive feedback (scale: 1 = strongly disagree; 5 = strongly agree) towards enjoyment of the game and how easy players found it to play (mean: 4.65 and 4.09, respectively), whether it increased their understanding of MSP and the extent to which they learned about its challenges (mean: 4.18 and 4.12, respectively).

With the majority of the sample answering positively to "I understand better what MSP is" (52 per cent "agree" and 33 per cent "strongly agree"), the game convincingly showed its pedagogical abilities, i.e. its potential for use as a teaching tool. Using a series of Spearman's rank-order correlations, the effect of increased learning was then tested against whether participants could better understand others' viewpoints, and if they gained insight into different factors of MSP and how they influence each other. These tests showed strong and positive correlations and statistically significant relationships across the whole sample ($p = 0.002$ and 0.000, respectively). This gives deeper insight into the way in which MSP was better understood, suggesting that players who felt that they had a better understanding of MSP also understood the importance of taking the priorities of other sectors in the game into account.

Similarly, a series of Spearman's rank-order correlations revealed that a high level of enjoyment of the game was strongly associated with participants gaining more insight into MSP issues ($p = 0.016$), as well as likeliness to recommend the game to others ($p = 0.018$). These relationships indicate that participants were more likely to share their experience of the game beyond the workshop environment if they found the game educational and enjoyable.

5.6. Discussion

As highlighted previously, participants' general lack of previous involvement in, or knowledge of, MSP did not appear to affect their ability to understand its challenges and enjoy playing the game. Instead, it could be argued that selecting and characterising stakeholders *because* of their historic underrepresentation and lack of involvement in previous initiatives actually enhances learning and knowledge exchange. As reflection and experiential learning enables implied knowledge to be made more explicit (Fazey et al. 2012), the effectiveness of role-playing and scenario-based learning can become a particularly useful approach when dealing with a topic such as MSP with lower knowledge-level groups. This allows less-informed participants to benefit from the knowledge of others on a given range of issues, of which the MSP Challenge game unearths many. As is evident from the examples of observed negotiations, each session yielded an entirely different host of issues, meaning that players (and organisers) constantly adapt and learn from the introduction of new arguments and discussions, emphasising the notion of knowledge as a process, as claimed by Reed et al. (2014). Encouraging this process of knowledge exchange within the gaming sessions may, therefore, support an effective two-way dialogue between the stakeholders and policy-makers by means of directly involving participants in debates that are representative of real-world marine planning challenges.

Drawing on the literature relating to the theory and practice of partnerships, the characteristics of observed decision-making during game-play suggest that the MSP Challenge board game has the deliberative potential to produce pro-environmental outcomes through informed policy responses. Further, consideration of the principles and best practice of democratic deliberation allowed observations to be made that discussions that actively avoided consensus of opinion and engaged in the motions of conflict yielded more practical outcomes. It is argued that because players engaged in reasoned discussions, assessing trade-offs and considering the concerns of others before developing one's own interests, the resulting decisions appeared to benefit those parties involved. Conversely, discussions that hastily arrived at consensus, without involving those who might have contributed opposing arguments to certain developments, were observed to end with somewhat counter-productive solutions. Highlighting these observations through a lens of democratic deliberation demonstrated the importance of partnership best practice in decision-making, concluding that encouraging players to adopt this approach in future workshops (or in real life marine planning development) would create the conditions best suited to comprehensively develop and test policies. In turn, this enables the self-governing capabilities of stakeholders.

Although participants responded well to the learning aspect, only partial fulfilment of the game's deliberative potential was recorded. In the feedback sessions, players suggested alterations to the game rules and session structures. Rather than 'nudging' people towards three-way negotiations, the game sessions should necessitate strict rules about what type of discussions are allowed, or disallowed, at a

particular stage. Despite this being viewed as a major challenge, the observed interactions between participants demonstrated the advantages of engaging in reasoned negotiations and was noted as a key strength of the sessions. Feedback from the questionnaires clearly indicated that players became more aware of the issues and influencing factors of MSP as a result of playing, enabling them to appreciate the views of other sectors in the game. To this end, social learning was noted at the individual level.

Sustained debate and enthusiasm for MSP, coupled with a likeliness to recommend the game to others, also hinted at the potential for wider learning within the broader stakeholder community. With participants enthusiastically continuing debates after the gaming sessions had finished, this alluded to the potential comparative effectiveness of gaming over more traditional methods of engagement. It cannot be concluded here but further studies may wish to examine this comparison, perhaps investigating the extent to which post-workshop knowledge of MSP becomes situated within broader stakeholder groups.

5.7 Conclusions from using the MSP Challenge board game around the Clyde Marine Region, 2017

The feedback from the questionnaires showed that most participants had minimal involvement in marine planning, giving the project a unique opportunity to both potentially increase awareness and understanding of the subject (and its challenges) and to give access to the preliminary stages of preparing a Regional Marine Plan for the Clyde.

A common theme running through all the July workshops was that participants struggled to fully grasp the concept of communicating and negotiating with people all around the board. This was despite being reminded and urged to do so regularly by the Game Directors, both before the games and during them. Perhaps understandably, they primarily focused on developing relationships amongst their own teams/geographic areas, which then often evolved into discussions with one of their neighbours but rarely, if ever, gave way to what was classed as ‘three-way transboundary’ decision making. If this is the experience of a sub-national approach within Scotland, it is highly possible that similar results will be observed in real life at the international scale.

Within the Clyde context, the game may be used in future to test how stakeholders contribute to potential Regional Marine Plan policy development, as opposed to simply using it as an introduction to the concept and complexities of marine planning at a spatial scale. This element was deemed too ambitious and complicated for this pilot project but it may yet be realised, although it will take considerable preparation and fore-thought to design a suitable scenario.

Despite the game exhibiting challenges to players and organisers, the general response to each session was overwhelmingly positive. Correlations showed that where participants indicated that they better understood MSP as a result of playing the game, they could also better imagine the viewpoints of

others as well as gaining an insight into the influencing factors involved. An increase in understanding the concept of marine planning was evident from both questionnaire feedback and observations during game play. Using the principles of knowledge exchange to assess the effect of appropriately representing and engaging stakeholders, it was concluded that social learning had occurred at least at the individual level. The impact of the game resulted in high levels of enjoyment and better understanding of MSP positively correlating with participants being likely to recommend the game to others. Even just talking about the game could, therefore, encourage the spread of marine planning into wider communities of interest. Moreover, with participants sustaining enthusiasm and debate over MSP issues after the gaming sessions had finished, this illustrated the game's comparable effectiveness over more traditional methods of stakeholder engagement, particularly if the aim is to facilitate such discussions within broader society. We conclude that the MSP Challenge board game has demonstrated its value as a novel method of stakeholder engagement at the Regional Marine Planning level within Scotland. We believe that the same results will be observed as/when the game is played at a national or international scale.

6. The MSP Challenge 'Firth of Colours' digital game

Originally, Marine Scotland intended that the SIMCelt Clyde Case Study would primarily address the development of a bespoke edition of the MSP Challenge 2050 digital game. Following its creation, it was anticipated that there would be a period for the technology to be used as an innovative method of stakeholder engagement in the early stages of work towards a Regional Marine Plan for the Clyde.

The MSP Challenge 2050 edition provided stakeholders with a way of better understanding the challenges of putting into action ecosystem-based marine spatial planning across international boundaries within a sea basin. It was felt that SIMCelt project offered a unique opportunity to adapt this tool to the particular issues that the Clyde Marine Planning Partnership would have to face during the early stages of development of the Clyde's Regional Marine Plan.

The International Game Architecture and Design Team at NHTV University of Applied Sciences, Breda was commissioned to revise, update and adapt the original MSP Challenge 2050 game concept and technology to create an electronic version designed to support the development of Regional Marine Plans within the overall Scottish marine planning context and, specifically, the Clyde Marine Region in the context of the SIMCelt initiative. However, the production of the board game in early 2016, just as the SIMCelt initiative was beginning, significantly changed the approach taken. As previously outlined, the Marine Scotland and NHTV teams worked successfully together to adapt the board game for the Scottish sub-regional context and it was put into operation via the Clyde Marine Planning Partnership.

Although work went on in the background on the updating of the MSP Challenge platform, the production of a bespoke version for the Clyde did not start in earnest until summer 2017. As a result, a request for an extension to the SIMCelt project was made by Marine Scotland in November 2017 to enable the work on the digital game to be completed, tested and to allow at least one game session to be held in the Clyde area before the end of the SIMCelt initiative.

6.1 Development of the 'Firth of Colours' digital game

Development of the game platform involved work on the overall supporting infrastructure in Unity and the design and implementation of the Graphical User Interfaces, for which applicable software licences were purchased. Maps of the Clyde Marine Region and data relevant to marine-related interests, ecosystems and human activities within it, taken from the Scottish Government's marine planning GIS and other sources, were provided by Marine Scotland and implemented into the game platform. An ecological model of the Clyde Marine Region, based on the 'Ecopath with Ecoism' platform (http://ecopath.org) was developed and incorporated to enable the impacts of activities on indicator species over time to be

visualised within the game context.[14] Extensive internal and external testing was undertaken to resolve technological and usability issues. The edition was named 'The Firth of Colours' in order to complement the existing 'Sea of Colours' suite of games that focus on anonymised countries surrounding the Baltic Sea and North Sea.

A demonstration of the digital game was given at the SIMCelt final conference in Liverpool, UK in November 2017 and a test session was played in Glasgow with members of the Clyde Marine Planning Partnership on 31 January 2018.

6.2 Main features of the Firth of Colours game

All the MSP Challenge games are based around the concept of a multiplayer set-up, allowing a number of participants to represent the interests of one planning authority within a wider sea basin. Multiple planning authorities and maritime interests, operating within a single marine ecosystem overlaid with artificial administrative boundaries, leads to competition for space and resources. Both the digital and board games are designed to enable players to develop communication and negotiation skills that allow the creation of Marine Plans for discrete areas within a bigger sea basin.

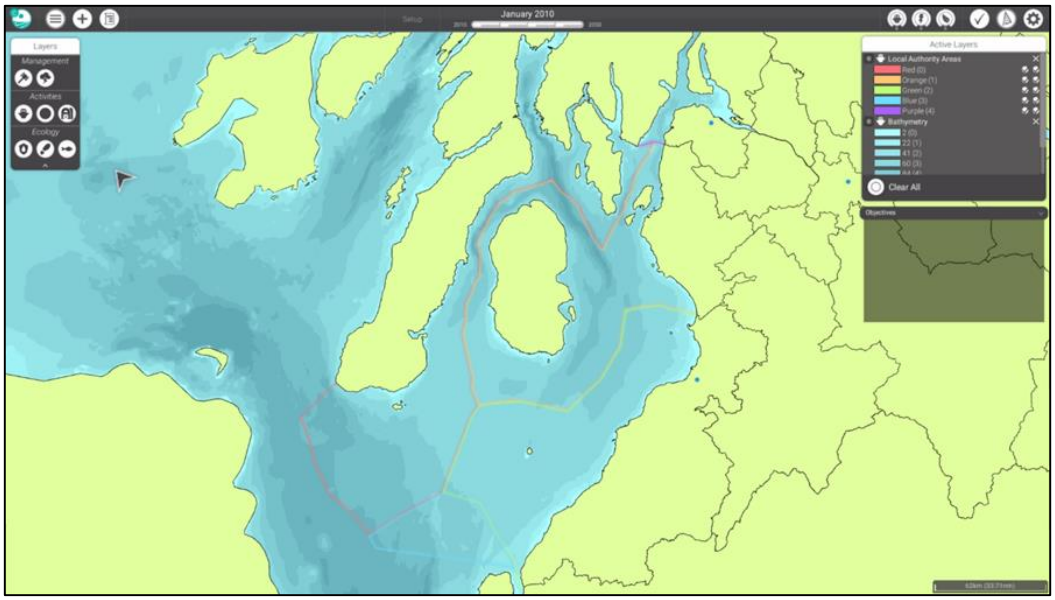

Figure 13: MSP Challenge Firth of Colours screenshot showing the five marine planning authority areas, named 'Blue', 'Red', 'Green', 'Orange' and 'Purple to anonymise them within the game context

[14] Mayer, I. and Warmelink, H. 2017. MSP Challenge 2050 - Clyde Edition (D4: NHTV Draft Final Report).

The Firth of Colours game offers the following:

- A multiplayer setup allowing at least a dozen game clients to each represent one of five anonymised marine planning authorities within the Scottish Clyde Marine Region;
- The ability to log in as a Game Facilitator or overall Region Manager, each providing additional control/functionalities to guide game play and to define and follow session-wide or player-specific objectives;
- An interactive map with data layers pertaining to shipping, fishing, recreation and ecology;
- The ability to develop new marine plans encompassing a choice of spatial forms (lines, points, polygons) and designations (shipping, recreation, ecological protection), to be developed and implemented at a chosen future date;
- The ability to set different statuses to marine plans to allow players to consult and confer with each, and make any amendments if deemed necessary;
- The ability to request and receive official approval from other players if a marine plan traverses those players' sub regions, thus facilitating transboundary communication;
- Plan monitor allowing players to get an overview of all approved plans, as well as their own;
- Month-by-month (in-game) shipping and ecology simulations (the latter based on Ecopath with Ecosim – see 6.4) responding to existing spatial use and the players' new marine spatial plans, once implemented;
- Dynamic Key Performance Indicators and graphs pertaining to shipping and ecology, continuously updated by the simulations;
- In-game time management allowing a Game Facilitator to define the length of real time and in-game time available for planning and simulation, in four blocks of 10 in-game years;
- Full plan approval control for a Game Facilitator or overall Region Manager.

6.3 Data gathering

Securing the necessary data for a bespoke edition of the MSP Challenge digital game was more difficult than anticipated. In Scotland, marine planning is underpinned by the national Geographic Information System (GIS) held by Marine Scotland and known as National Marine Planning Interactive[15] (NMPi). This is an electronic repository of the information drawn together in the hard copy volume, 'Scotland's Marine Atlas', which was produced in 2010 to inform the development of the National Marine Plan. NMPi contains over 700 layers of data and is part of an integrated suite of interactive platforms that make such information available via the Marine Scotland Open Data Network (MSODN) [16].

[15] For further information see: http://www.gov.scot/Topics/marine/seamanagement/nmpihome
[16] http://www.gov.scot/Topics/marine/science/data

Marine Scotland's GIS facility operates on the presumption of data being developed or purchased once but being used for multiple applications across marine planning requirements. The development team at NHTV was given access to what was available on NMPi in relation to the Clyde, but it soon became evident that some key data was not available in the format in which it was needed for inclusion within the game platform. The was particularly the case with shipping where the developers needed to know how many cargo vessels of four broad categories and size in Dead Weight Tonnes (DWT) called at ports around the area. The game platform required this specific information in order to generate shipping intensity maps but annual figures returned to the UK Department for Transport did not go to this fine level of detail. Additionally, while Marine Scotland was licenced to use data from external sources for the purposes of its own NMPi, the conditions attached to those licences did not extend to Marine Scotland making the information available to a third party.

In order to overcome the specific issues relating to shipping, the major port operating companies around the Clyde were asked to revise their data, where possible, to provide an element of the breakdown required. Negotiations with external data holders such as the Royal Yachting Association also resulted in some additional licences being purchased so that data relating to important uses of the Clyde Marine Region, such as marine-related recreational activities, could be utilised by the NHTV team.

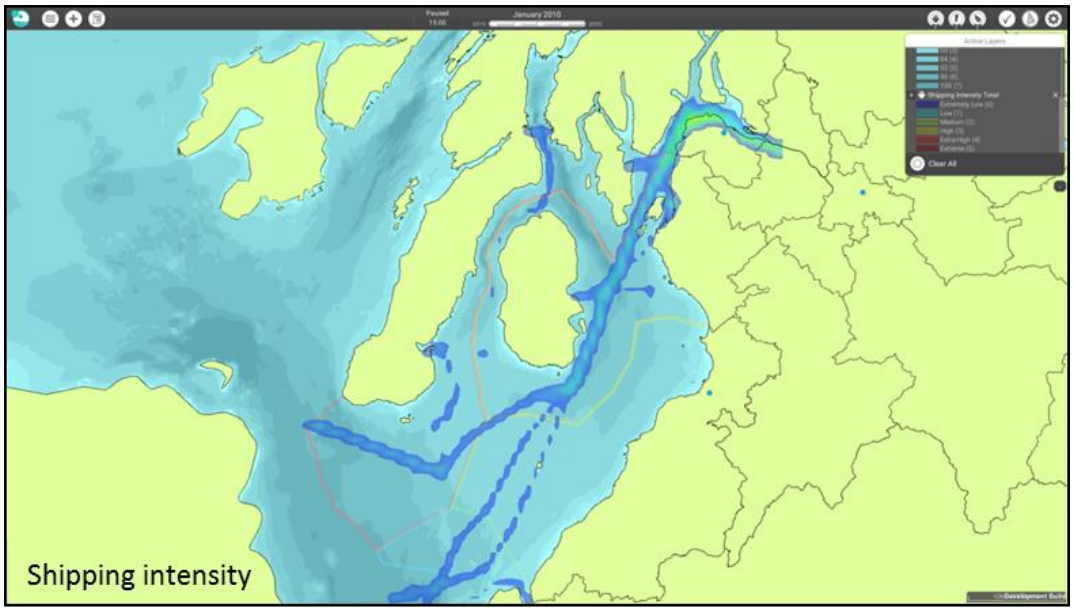

Figure 14: MSP Challenge Firth of Colours screenshot showing shipping intensity across Marine Region

6.4 Ecopath with Ecoism model

The MSP Challenge game platforms make use of the 'Ecopath with Ecoism' (EwE) model, which considers the *state* of a number of environmental indicators when different *pressures* are exercised on them. The software is able to calculate how environmental criteria, such as stocks of specific fish species and the health of the benthos, might respond to variations in human activities like changes in shipping intensity or fishing effort and their associated impacts, such as underwater noise or seabed disturbance.

Under the NorthSEE project, work was already under way to update the existing EwE model relating to that sea basin but there was reticence to use North Sea related data on habitats and species for a very different sea area. Happily, during the trawl for Clyde-related data, it became apparent that the Scottish Association for Marine Science (SAMS) had an existing 'Ecopath with Ecosim' model created for the Clyde. Intensive modelling work was undertaken in late summer 2017 with both SAMS and the Ecopath International Initiative Research Organisation to refine the available data for use within the Firth of Colours game. The resulting model was tested at NHTV in Breda in early October 2017, which demonstrated that the Clyde information worked but highlighted some areas for further fine-tuning.

A report detailing the activities in relation to this work, which followed the EwE methodology for best ecological practice whilst also using and developing the EwE model guidelines for MSP gameplay is available as a supplementary document to the SIMCelt project (Bentley et al., 2017).

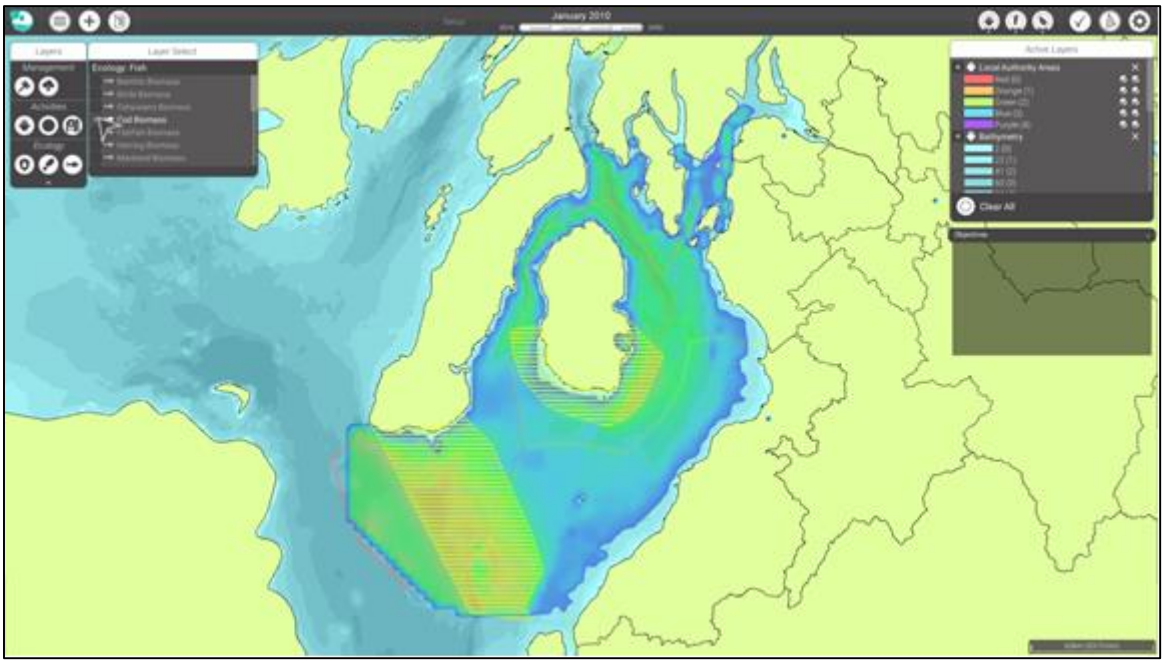

Figure 15: MSP Challenge Firth of Colours screenshot showing Marine Protected Areas and cod biomass at the beginning of a game session, as simulated by the 'Ecopath with Ecosim'-based ecological model

6.5 Ocean Viewer - Proof of Concept

The MSP Challenge 2050 edition contained graphics that were cutting edge at the time (2011) but had been superseded by technological developments in the intervening years. In particular, the 2.5D graphics of vessels and port facilities (Figure 2) had a limited and outdated functionality and looked very basic when compared with more recent commercial standards of animations. All the updated MSP Challenge game platforms were seeking ways of improving the visual experience of participants.

During 2017, a team at NHTV explored research and development options to create an up-to-date 3D ocean visualisation module for the digital MSP Challenge games. The SIMCelt project allowed work to be carried out in partnership with the NL Rijkswaterstaat to develop a proof of concept for a 3D software package called Ocean Viewer, which provides an immersive 3D marine experience for the player and demonstrates levels of interactivity that were unavailable to earlier editions of the MSP Challenge games[17]. Tailor-made graphic models of coastal landscapes, vessels, offshore wind turbines, birds and marine infrastructure such as ports and terminals are under development to create an Asset Library that can be incorporated into different versions of the MSP Challenge game platform. For the Firth of Colours version, a 3D representation of the iconic Paddle Steamer 'Waverley' was produced as part of the Proof of Concept. This graphic will allow users to 'sail' around the Clyde and see the areas and assets that are being developed and managed from a sea-level perspective. The immersive view enhances the game-based learning process as well as the overall attractiveness of the game.

Figure 16: Ocean Viewer 3D representation of the P.S. Waverley during Firth of Colours game session, 31 January 2018

[17] A report on the development of the Ocean Viewer concept has been produced by NHTV as a supplementary document for the SIMCelt project (Relouw, J. et al., 2017)

6.6 Stakeholder workshops

The delay in the development of the Firth of Colours digital game meant that time for testing and playing it with stakeholders was very limited but the extension to the SIMCelt project allowed for two sessions to be organised. The first was a demonstration of the game technology as a 90 minute workshop as part of the SIMCelt conference in Liverpool on 29 November 2017 and the second was a longer session with members of the CMPP and Marine Scotland in Glasgow on 31 January 2018.

Feedback from the short Liverpool event was limited but useful. Participants flagged up the importance of having a clear and simple message about what the tool was intended to achieve and of being prepared to defend sources of data against those who might dispute 'academic' information in lieu of 'real world' experience. This was particularly the case for data relating to some species of fish within the Ecopath with Ecoism model but the developers noted that the software enables specific data layers to be turned off if local sensitivities require it.

Figure 17: Firth of Colours edition is introduced to members of the Clyde Marine Planning Partnership, Marine Scotland and others on 31 January 2018

The session in Glasgow ran for five hours and enabled the Firth of Colours game to be introduced to some of the audience for whom it had primarily been designed. Participants included some who had been involved in the development of the component software, e.g. the Clyde Ecopath with Ecoism model,

or those who had tested earlier versions of the game in Breda in October 2017 and given their feedback on navigation and visual aspects. There were also representatives from: two real-life Clyde-side local authorities who have a duty to take marine planning into account in relation to terrestrial planning; the Scottish Government's statutory nature conservation advisory body, Scottish Natural Heritage , and from the largest port company in the area. The participants were mixed into five teams of two 'Marine Planners' and the Dutch developers introduced the technology with a loose scenario to test the perceived tensions between shipping, recreation and fishing resources.

Those who were used to a proprietary GIS tool, such as Arc 10.1 found the different navigation awkward at first and lacking the fine level of detail that their own systems provide. However, practice gradually enabled data layers to be examined and lines and polygons to be added to represent shipping routes, Marine Protected Areas, recreational routes and associated facilities and aquaculture installations.

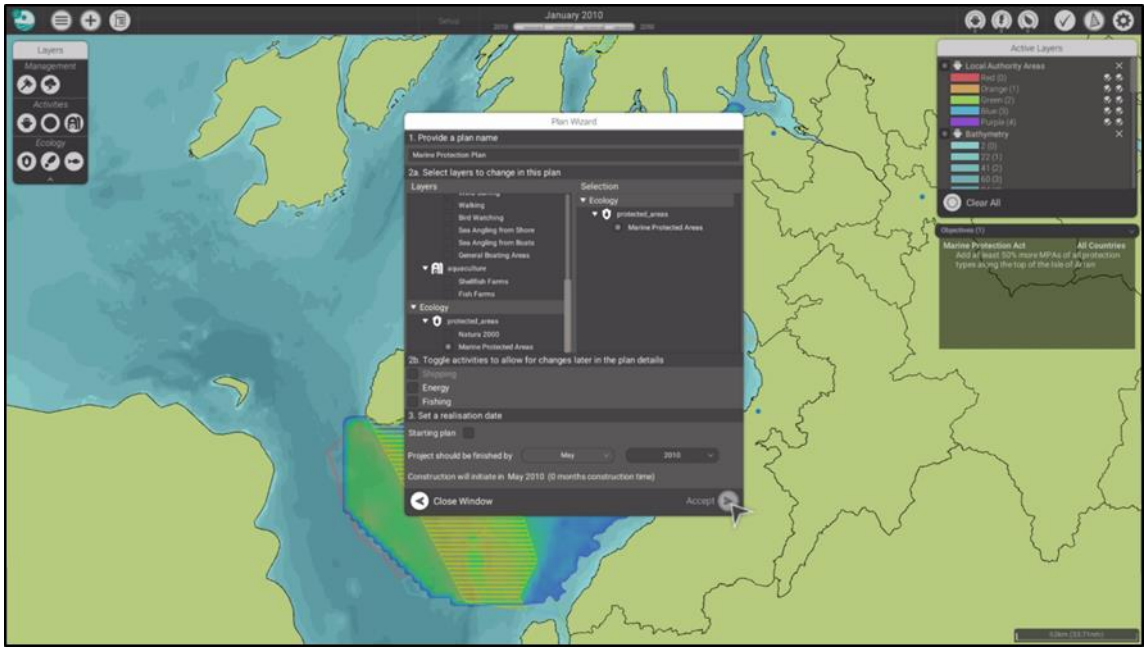

Figure 18: MSP Challenge digital game screenshot showing the Plan Wizard, i.e., a window in which players can start defining a marine plan

The game software allows marine planning to be carried out in five different administrative areas, making up the 'Firth of Colours', over a period of up to forty years divided in to four blocks of ten years. Marine Plans are created via the Plan Wizard feature; teams use this feature to set the parameters to address the aspects they consider to be important to their area's economic, ecological or social interests.

In order to further refine the content of their Marine Plans, the teams must propose options for developments and consult on them with the other participants. This is done via the Plan Monitor window. The software not only enables players to keep track of their own proposals over time but also allows them to see when a new initiative elsewhere comes into effect and may have an impact on local interests.

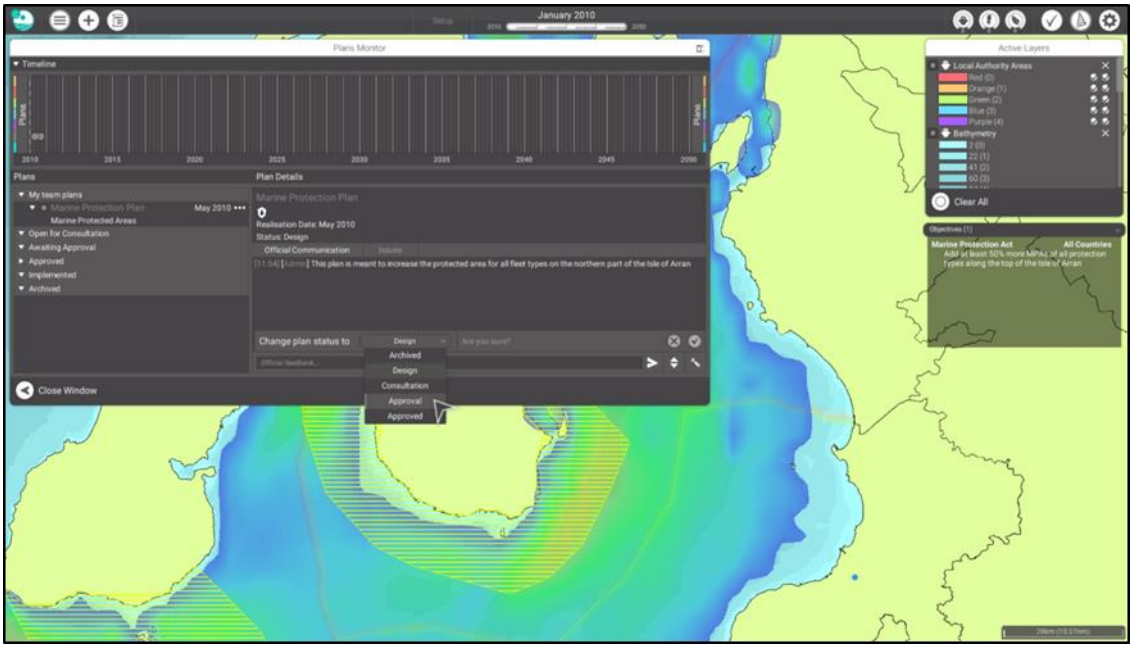

Figure 19: MSP Challenge digital game screenshot showing the Plan Monitor, a window in which players can keep track of their own and other approved marine plans

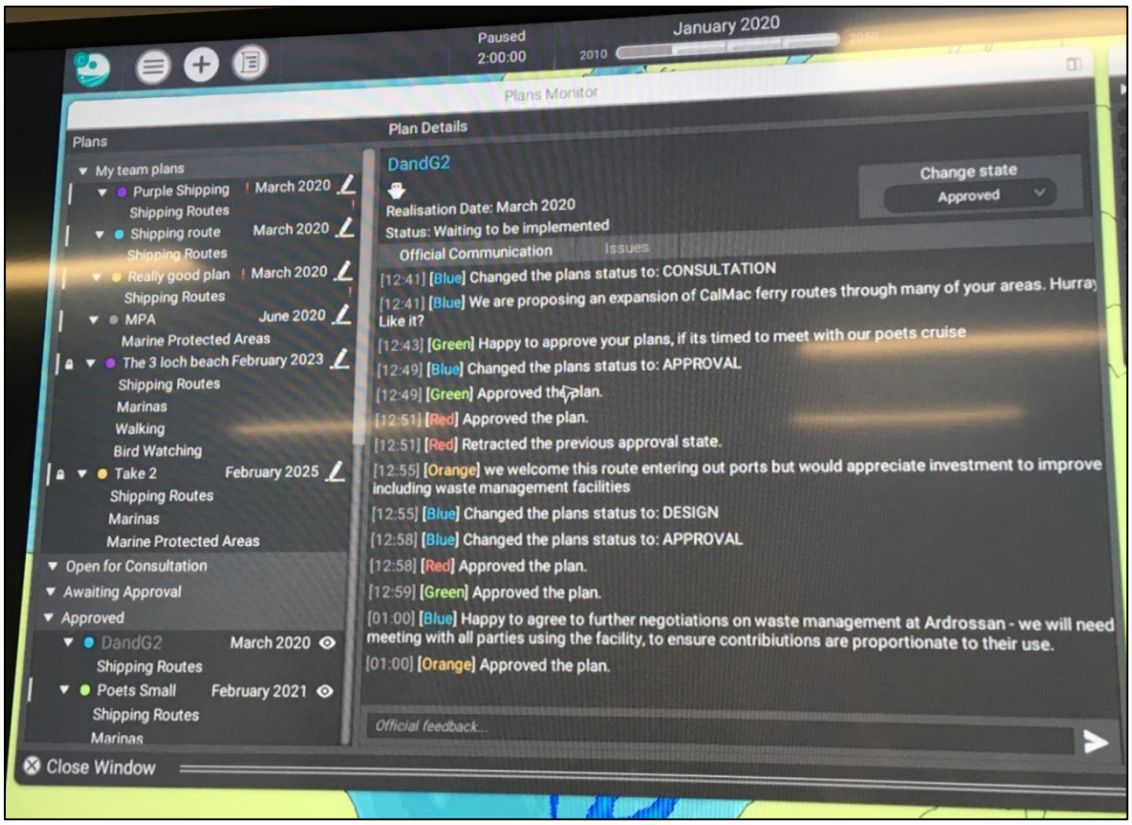

Figure 20: Plan Monitor tool being used by three out of five Planning Authorities to comment on and approve the Blue team's Shipping Route Plan, including conditions to approval being granted.

The Plan Monitor tool was used extensively by the players to comment online on the proposals being put forward by other teams in their Marine Plans. Figure 20 demonstrates evidence of a willingness to support an expansion of ferry routes within the area if it connected with another initiative, e.g. a 'Poets' Cruise' and where there was an opportunity to directly improve a related marine management measure, such as the request for investment on port waste reception facilities at a specific location. Playing this version with people who were familiar with the area's real-life scenarios and challenges brought a hyper-realistic aspect to proceedings and enabled them to be discussed in open forum.

In an interesting development, the use of write-on/wipe-off laminated maps of the Marine Region eventually became an essential tool in working out possible ideas for asset development within planning areas. They proved highly valuable in explaining proposals to neighbouring authorities in order to secure their support during the consultation phase of plan development. Only one group did not make use of the maps at all, preferring to do all their planning on screen.

Observers noted two teams (Orange and Green) taking their hard copy maps to all the other authority areas and outlining their ideas for proposals, which meant they were communicating *across* the Firth and not just with their adjacent authorities. This development could have been because those playing the electronic game are more used to a participatory and consultative approach on a professional level and also because they had an established understanding of marine planning. Whatever the reason, it was refreshing to note that what was never actually achieved in the board game was done as a matter of course within the digital version.

Figure 21: Green Marine Planners use the 'write – on/wipe-off' maps to test ideas for marine planning in their area

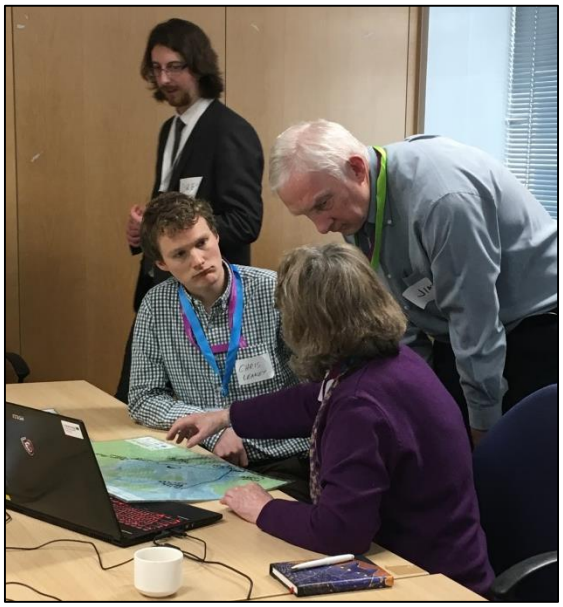

Figure 22: Cross-border consultation on Green's proposals in relation to Blue's interests

The event concluded with the Game Facilitator running the time sequence from 2015 until 2040 so that participants could see the changes made to the area in terms of spatial distribution of activities as new Plan's policies were implemented. They could also review the impacts on some ecological Key Performance Indicators, which demonstrated that the Ecopath with Ecoism software worked.

An unexpected outcome was that the EwE module showed the results of human-scale decision making on the interactions between complex ecosystem models, even if those results were not what the marine planners had had in mind when they were put in place. For example, the designation of an area as a no-take Marine Protected Area (MPA) for rays and skates resulted, over time, in a significant increase in those species but, eventually, in a crash in the numbers of supporting prey species. This, in turn, led to a decline in the number of protected species in spite of the MPA designation. The EwE model clearly demonstrated the Law of Unintended Consequences that is a feature of real-life decisions, even when taken with the best of intentions.

6.7 Questionnaire responses

After the conclusion of the 'hot wash-up', where immediate impressions and feedback were given and a number of snags identified for correction, a short questionnaire was handed out for completion. For consistency with the MSP Challenge board game, this was the same as had been distributed at all the games played during 2017. A copy of the questionnaire is included at Annex 3.

The audience for the digital game already had a high level of involvement in marine planning. On a scale of 0 to 10, where 0 meant 'not at all' and 10 stood for 'deeply involved', 60% indicated that they had a deep professional involvement in the subject matter. A further 20% rated their professional involvement at 8/10. This was, therefore, a collection of players who already knew about many aspects of marine planning and had had cause to think about what it meant for their own interests.

Despite this, the overwhelming majority – 90% of the sample – answered positively to the statement "I understand better what MSP is" (70% "agreed" and a further 20% "strongly agreed" with only 10% saying they neither agreed nor disagreed with the statement). This suggests that players approached the session with an open willingness to learn more about a subject with which they already had some level of familiarity and that the digital game displayed its potential for use as a teaching tool.

Due to the small sample size (n = 10), it was not considered appropriate to submit the results to the same process of statistical analysis as had been undertaken on the assessment of the board game. However, some basic analysis was undertaken on the results to offer some comparison with the findings from the board game. Comparisons between the findings from the two games are discussed in Section 7.

On a scale where 1 = strongly disagree and 5 = strongly agree, the mean scores for key elements tested were:

- increased understanding of MSP mean: 4.1
- learning about challenges involved mean: 4.3
- the enjoyment of the game mean: 4.7
- how easy it was to play mean: 4.3

This statistical assessment indicates that the feedback given was extremely positive.

Without using a series of Spearman's rank-order correlations, we cannot say for sure that there was the same evidence for a correlation between an increased understanding of MSP itself and a better understanding of the viewpoints held by others that had been demonstrated by the board game. However, in a straight assessment of responses, 70% agreed with the statement "I can better imagine the different viewpoints on MSP" and a further 20% strongly agreed with it. In relation to the statement "I gained more insight into what the important factors are in MSP and how they relate to each other", 50% agreed while a further 20% strongly agreed (30% neither agreed nor disagreed). A written comment noted that the game "bridges the gap between policy/management and science and generates a whole new audience for complex ecosystem models". This would suggest, therefore, that the game goes some way, at least, towards indicating a positive relationship between a better understanding of marine planning itself and of understanding the importance of taking the priorities of other sectors into account.

Finally, for a complex computer-based entity that had to be taught and learned, rather than just picked up and played with, the feedback on ease of use of the game was particularly interesting: 50% of participants strongly agreed that it was easy to learn how to use and a further 30% agreed with the statement. Such positive responses were probably due to the professional and engaging way in which the team from NHTV University of Applied Sciences explained how to operate the system and play the game. It will take some time and considerable familiarisation with the equipment before the team from Marine Scotland is in a similar position.

Figure 23: Developers and first players of the MSP Challenge Firth of Colours – Clyde Marine Region edition, 31 January 2018

6.8 Discussion

Those who played the Firth of Colours digital game in Glasgow made up a small and select audience, with a history of involvement in the early development of marine planning at the regional level in Scotland. Participants had an above-average understanding of what marine planning is, what it entails and a direct interest in its use as a tool for securing sustainable marine development and the protection of habitats and species. While some participants had regular, hands-on experience of GIS-based planning tools, they were the exception; the majority was more used to considering how to balance the many different and competing activities and interests at a policy or human-scale level. Ages ranged from early 20s to over 65 but it was noticeable that while some took a little longer than others to pick up the navigation tools, no-one was unable to participate.

Almost all had a personal knowledge of the geographic area covered. In some cases this was a positive contribution as it meant they could communicate effectively with each other about real-life issues in particular areas, often highlighting them with the cursor on the map on the laptop screen. However, one player had no knowledge of the Firth of Clyde at all and commented that she felt at a substantial disadvantage in discussions with the other local players. A lack of place names and no indication of the sizes of centres of population on the hard-copy maps were also revealed as oversights that caused unintended confusion about which town or port was which. In a positive effort to overcome the confusion, players consulted the relevant data layers on their laptops and were able to write the necessary information on the hard-copy maps to facilitate play continuing.

Given the breadth and depth of real-life experience from around the area, it was sometimes

difficult to keep discussions focused on the fictitious nature of game play: reality had a habit of emerging and confusing matters. Additionally, some comments challenged the veracity of the data on the health of fish stocks in the Clyde that underpinned the Ecopath with Ecoism model. Similar comments had been raised in the demonstration session in Liverpool and it is likely that the data will be robustly challenged when the game is played with representatives of Clyde-based fishing associations in due course. The fact that this is a simulation game, constructed with best-available data from a number of different sources, is often easy to forget.

Ironically, it was considered that the best possible audience for this game would be when marine planners from *another* part of Scotland made use of it. It was felt that those with a sound understanding of the principles of marine planning but with little, or no, direct ties to the Clyde area would be able to extract maximum benefit from it, without being distracted by real-life scenarios. That hypothesis remains to be tested but experience from the original MSP Challenge 2050 game suggests that it is fair: ideas about what could happen in relation to Blue Growth and environmental protection are much less constrained when players are unencumbered by actual knowledge of a specific area its challenges.

6.9 Conclusion

A single session does not allow sufficient evidence to conclusively state that the Firth of Colours version of the MSP Challenge game will assist marine planning at the regional level in Scotland. Snags in the software still remain to be resolved and the test audience was constructive in its approach to the game, which might not be replicated with a different mixture of participants. However, initial indications are positive, not least the very natural way in which transboundary marine planning issues were addressed and cross-border communication took place to achieve positive benefits for all authorities involved. As a novel method of stakeholder engagement, it is contended that the Firth of Colours game has significant potential both in the Clyde Marine Region and in the other Scottish Marine Regions around the coast as they are created.

7. Using 'serious games' as a novel method of stakeholder engagement in marine planning

7.1 Comparisons between MSP Challenge Scottish Marine Region board game and digital game

The development of the MSP Challenge board game gave an unexpected dimension to the case study looking at the use of 'serious games' as a means of effectively engaging with stakeholders in marine planning. It turned out to provide a 'low tech' corollary to the 'high tech' of the pseudo-GIS approach but the overall outcome has been that while each has been used to engage with very specific aspects of the marine planning stakeholder community in Scotland, it is clear that both have the capacity to complement each other when deployed together as part of an overarching strategy for stakeholder engagement and public participation.

The audiences for the games were different but were intended to be. Both games, however, are intended to be used by those with some, little or no knowledge of ecosystem-based marine planning. They are designed to facilitate an understanding of the concept of the process and to provide some enlightenment about how difficult it can be to achieve positive outcomes.

In general, the board game was deployed to audiences who had a range of personal interests in marine activities but who were not likely to consider themselves as 'marine planners' *per se*. The digital game was used by those with more of a professional interest in the topic and for whom it was a regular part of their working life. It is worth noting, however, that both games are designed for use by people who are interested in the planning and management of marine and coastal resources, not just by those who have a professional connection to the topic.

Many from both audiences had been involved in the incremental development of Scotland's marine planning legislation and, latterly, in the implementation of the National Marine Plan because of the duties it imposes on their own organisations, such as local authorities or public bodies. Their involvement in the Clyde Marine Planning Partnership was the latest manifestation of a long-standing, wide-ranging and incremental approach to stakeholder engagement as marine planning has been developed for Scotland. Their willingness to be involved demonstrates that investment in stakeholder engagement over time and through more traditional processes creates a resource that can be drawn on when required for novel but connected purposes.

Table 5 summarises and compares the mean scores for the statements from the post-game questionnaires, completed after sessions with both the board game and the digital game. A full statistical analysis of the feedback from the questionnaires from the board game sessions is available in Crawford Paris's MSc dissertation but the relevant excerpt is reproduced in Annex 3. The note below the table shows the incremental aspects of the scale used to calculate the mean from the feedback obtained from both games.

Table 5: Summary and comparison of mean scores for post-game Questionnaire Statements

Statements	Mean scores	
	Board game (n = 36)	Digital game (n = 10)
I think it is easy to play the game	4.09	4.3
I enjoyed playing the game	4.65	4.7
The issues in the game represent the challenges in MSP	4.44	4.3
I have become more interested in marine spatial planning	4.06	4.0
I understand better what marine spatial planning is	4.18	4.1
I can better understand the different viewpoints on marine spatial planning	4.21	4.1
I gained more insight into what the important factors are in MSP and how they can influence each other	4.12	3.9
I am likely to recommend this game to others	4.42	4.7

Note: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly Agree

The mean scores clustered around 4 indicate that the players of both games largely **agreed** with the statements, even when they had varying degrees of direct experience of marine planning to date.

There was some element of overlap between the audiences: three participants played both versions of the MSP Challenge and one who had played the board game helped to facilitate the digital game during the session in Glasgow. A comment from one player who experienced both versions notes, "The (digital) game is easy to use for all abilities. Quite different to the board game version but similar amounts of interaction between participants. Helpful to have lots of facilitators to help. This would be a great tool for actual consultations and responses."

7.2 Concluding remarks and recommendations

Article 9 of the EU Maritime Spatial Planning Directive[18] requires that "Member States shall establish means of public participation by informing all interested parties and by consulting the relevant stakeholders and authorities, and the public concerned, at an early stage in the development of maritime spatial plans, in accordance with relevant provisions established in Union legislation." It also requires Member States to "ensure that the relevant stakeholders and authorities, and the public concerned, have access to the plans once they are finalised." The concept of stakeholder engagement and public participation in the process of marine planning, as well as being good practice, has been sanctioned at the highest level.

[18] EN L 257/142 Official Journal of the European Union 28.8.2014

Stakeholder engagement is an already-established concept across policy fields in EU Member States but the extent to which it is carried out varies. In some countries, it is limited to consultation by Government with professional bodies who are expected to be 'the experts' in their subject and advise accordingly. In others, there is a presumption for extended consultation with members of the general public, whose knowledge of the subject matter may be limited at the start of the process but who are part of a wider community of interest. Previous work on the nature of stakeholder engagement in the Celtic Seas area highlighted the differences between the UK, Irish and French approaches but invested in ways of increasing stakeholder understanding of marine policy and approaches to marine management, particularly the ecosystem approach. The Celtic Seas Partnership programme, although not looking specifically at Maritime Spatial Planning, facilitated an understanding of the issues involved in the EU Marine Strategy Framework Directive and increased the availability of data, information and methodologies for involvement *for the people who need them*.

The use of 'serious games' within the sphere of marine planning does the same thing. For those who are already immersed in the terminology and workload, the games can be regarded as a light-hearted sideshow to the serious work of developing marine plans to enable sustainable Blue Growth and marine protection measures. But to dismiss them as bit of fun is to ignore the opportunities they provide for education in marine issues in general and raising awareness of the spatial aspects connected with use of marine resources in particular.

The MSP Challenge board game set out to create an effective dialogue with stakeholders and one of the criteria was that the game should exhibit characteristics of social learning. Moreover, the research carried out during summer 2017 also aimed to examine whether the board game demonstrated qualities that could potentially test policy scenarios and contribute to the delivery of high-level outputs for the purposes of preparing a Clyde Regional Marine Plan. Correlations from evidence gathered at the events showed that where participants indicated that they better understood marine planning as a result of playing the game, they had gained an insight into the influencing factors behind marine planning and could better imagine the viewpoints of others involved. Using the principles of knowledge exchange, it was concluded that social learning had occurred at least at the individual level. The visual and tactile impact of the game resulted in high levels of enjoyment being noted and an improved understanding of the MSP positively correlating with participants being likely to recommend the game to others. Drawing on evidence of enthusiastic debate of issues and experiences after the games had ended, it was projected that even just talking about the game could encourage the spread of marine planning issues into wider communities of interest and practice. It is argued, therefore, that the MSP Challenge board game illustrates comparable effectiveness over more traditional methods of stakeholder engagement where there may be less dynamic interaction between participants and retention of relevant information.

Within the confines of the SIMCelt programme, it has not been possible to play the digital version of the bespoke 'Firth of Colours' game to the extent originally envisaged, which has been disappointing. However, the teams from Marine Scotland and NHTV have worked successfully together to adapt and deploy the MSP Challenge board game for the Scottish sub-regional context. From late 2016, while the digital version was in development, the board game's low-tech, hands-on approach provided an unexpected opportunity to engage with a far wider number of people at a more fundamental level and enable a greater awareness of the rationale behind marine planning at the Regional level in Scotland. The view from Marine Scotland is that the board game, in particular, has been "money well spent".

The Firth of Colours digital game has made a positive first impression and is intended to be used beyond the SIMCelt project, both within the Clyde Marine Region and as an educational and decision-making support tool elsewhere as further Scottish Marine Regions are rolled-out. As with the board game, the technology will be made available for use in the wider Celtic Seas area. The lessons learned from the software development are already being utilised for the updating of the North Sea edition of the 'Sea of Colours' game, which is being delivered via the 'NorthSEE' project, an EU Horizon 2020 initiative looking at issues connected with shipping, energy and ecology in the North Sea area. As the 3D Ocean Viewer software is further developed for the updated North Sea version, the intention is that it will be retrospectively fitted to the Firth of Colours game.

It is still probably too early in the Scottish Regional Marine Planning process to determine the success of using gaming as a technique for education and awareness-raising of ecosystem-based Marine Spatial Planning but indicators from this Case Study are extremely positive. Marine Scotland is confident that the benefits will be demonstrated as the development of the Clyde Regional Marine Plan progresses and the Clyde Marine Planning Partnership is committed to using both versions of the MSP Challenge games as an integral part of their stakeholder engagement process. During the winter of 2017/18, further sessions with the board game have been organised in more coastal communities and with three schools in different parts of the Clyde area, in association with other stakeholder engagement techniques. All have reported similar levels of enthusiasm for the 'learning by doing' approach encapsulated by the game and participants continue to offer ideas for further improvements, so it remains a learning experience for the Game Facilitators as well.

Additionally, during the life of the SIMCelt project, the games' fame has spread throughout the Celtic Seas area and beyond. Other groups have made use of the board game as a team-building exercise and educational tool and there is now interest in making use of the digital version too. They are perceived as being complementary to each other and able to facilitate involvement in marine planning from very disparate audiences. Those who have started with the board game are enthusiastic to progress to the digital version as preparation for 'marine planning for real'.

It is, perhaps, unfair to contrast the results from the much longer programme of stakeholder engagement for the board game with a single session of the digital game held at the end of the SIMCelt project. The board game was used on multiple occasions during 2016 and 2017, not just with the groups identified in this report but with many other organisations and for purposes ranging from a team-building exercise for members of Marine Scotland's Marine Planning Policy and Licensing Operations Teams to a demonstration at the Irish Sea Maritime Forum bi-annual stakeholder conference in Dublin. Most notable was the session played with members of an inward mission from the Namibian Government, who were on a MSP fact-finding tour of the Netherlands and Scotland. They brought an entirely new and fresh approach to the game, with the female members of the team thoroughly enjoying the fact that their views were valued equally alongside those of their male colleagues and suggesting that new roles of Lawyers, Politicians and Bankers be incorporated within the game to make it more reflective of their own experiences. Unique amongst the players, they made good use of the deep-sea mining tokens drawing on their real-life experience of deep-sea mining for diamonds off the Namibian coast.

Figure 24: MSP delegation from the Namibian Government play the MSP Challenge board game in Edinburgh, 6 September 2017

As SIMCelt ended in March 2018, the Irish Government asked Marine Scotland to bring the board game to Dublin and run a taster session for the members of the new MSP Advisory Group, set up to assist in the development and production of the Irish Marine Spatial Plan by 2021. This short session demonstrated a keen appetite in Ireland for getting to grips with the complexities of marine planning, albeit at a time when the implications of the UK's decision to leave the European Union are still uncertain.

Figure 25: Members of the Irish Government's MSP Advisory Group play the MSP Challenge game in Dublin, 20 March 2018

The SIMCelt Clyde Case Study has demonstrated that the use of 'serious games' as an innovative method for stakeholder engagement in relation to increasing the understanding of ecosystem-based Marine Spatial Planning. By facilitating knowledge of the issues relating to the sustainable use and protection of marine and coastal resources within a single waterbody, both the board game and the Firth of Colours digital version have encouraged dynamic discussions across human-scale administrative boundaries about how marine planning may be best put into effect. The games allow for communicating the concept of ecosystem-based MSP to a wider audience and for bringing together the established marine planning community and newcomers. They also allow for a 'safe' environment within which discussions can take place, often relating to contentious real-life issues. Experience suggests that better outcomes are developed through negotiations that involve arguments, incremental resolutions and compromise: this in turn suggests that the games may help to develop a common language for marine planning across many sectors and interests.

While the experiment has been fruitful in terms of outcomes, it has above all else been fun. The enthusiasm with which both the board game and the digital version have been received has been a consistent feature of the Case Study. Long-standing planning professionals love placing a small plastic tile on a board and local coastal campaigners who feel their interests to be ignored can be rejuvenated after a session. In making ecosystem-based MSP (a little) less complex for the communities of interest

involved, we have been able to deepen our own insights into the subject matter. The games prove to be an extremely effective method for all marine planning stakeholders to communicate and work together, across boundaries, on the shared issues of ecosystem-based MSP.

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Annex 1: Supplementary information document prepared for Glasgow University students' session, October 2016

HOW TO PLAY?

You are a participant in the overall marine planning process; either as a marine planner for one of the three local authorities or as the representative of one of the stakeholder groups with an interest in the area.

You are to work with your colleagues to develop a high-level Regional Marine Plan for the Rica Sea that complements the National Marine Plan's objectives but reflects the geographic specificities and local Blue Growth policies of Bayland, Peninsuland and Island.

MarineRica expects that you will participate in open and engaged discussions that result in agreements within individual local authority areas about their own priorities AND with the other two authorities so that their proposals do not adversely affect your own, or vice versa. Transboundary and cross-border agreement should be achieved over the positioning of developments, including supporting infrastructure such as pipes, cables and shipping routes that may run through adjacent water bodies.

Ecological, economic and social functions are represented by **tokens and threads**.

- Coloured squares with symbols show different marine-related functions. Rolls of thread in different colours indicate the different sorts of sailing/shipping activities.
- Planners develop economic and ecological functions by placing the corresponding tokens onto the grid, using the pins provided. Tokens and threads already on the game board, along with Opportunity Maps, give some direction on how to develop the marine area. Certain economic and ecological functions can be combined but other functions will conflict with each other.
- Discussions about cross-border and transboundary issues will be key. Representatives of marine industries within the different areas should consider how their interests might be best served across marine planning boundaries. Planners should also discuss the best positioning of activities in the Rica Sea as well as in their own authorities' areas.

At the end of the session you will be invited to give your feedback in an Open Forum.

ESSENTIAL ROLES:

Each Local Authority area MUST have the following people:

- Marine Planners (2 – the people with the job of making the decisions!)
- Nature Conservation Advisor (1 – giving advice to the planners on which activities can go where).

Players will also represent the following, taking a more strategic view of the Rica Sea area:

- **Port Operations Director** (up to 3 across the geographic area – ports cater for different shipping interests, e.g. medium-sized ports that bring import/export freight or small ferry ports that operate lifeline services for coastal communities. A port company may own and operate ports in more than one local authority area.)

- **Shipping Company Managers** (up to 3 across the geographic areas - players should represent a different shipping interest, e.g. ferries providing links to islands, freight shipping, the development of cruise routes or the construction and servicing of offshore wind farms. As their ships get bigger, so do their aspirations!)
- **Marine recreation developers** (up to 3 with different ideas of how marine-based recreation could be developed, e.g. high-spend/low footprint ecotourism that values a pristine natural environment or marina developers that want to promote an area as a playground for sailing and powered leisure craft.
- **Aquaculture company site manager** (1 or 2 representatives, trying to ensure that their fish cages are situated in appropriate areas for optimum growing conditions)
- **Offshore energy developers** (1 or 2, possibly interested in different sorts of offshore renewable energy, e.g. windfarms or sub-tidal turbines; think about best places to put the devices and the links to shore that will be needed to build and service them.)

In playing, we will base the activities around elements of these three case studies:

Case Study 1: The National Marine Plan recognises the importance of **SHORT SEA SHIPPING** as an efficient method of transporting goods and passengers across coastal and marine areas. Shippers are eager to invest in short sea shipping routes to cater for ferries, freight and cruise traffic and related upstream/ downstream activities connected to fishing, wind farm construction and maintenance, etc. All economic activities in the Rica Sea need to be connected to a port so planners need to coordinate with shippers and port operators over developments. Certain activities may conflict with shipping for ecological or other reasons, such as safety. Hence, shipping lanes may not go through some marine protected areas, wind farms or military zones. Existing or potential conflicts need to be resolved through discussions among planners and shippers.

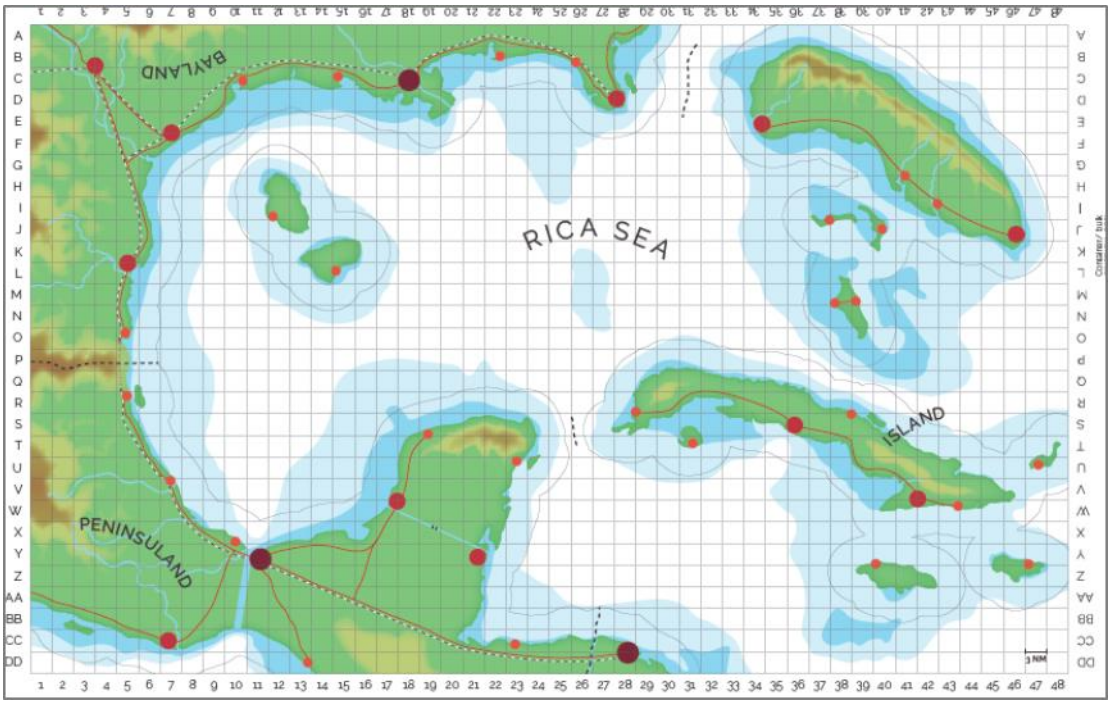
Case Study 2: **MARINE-RELATED TOURISM** already exists in each of the three local authority areas and has been recognised as a significant contributor to the national economy. The National Marine Plan seeks further development of the sector but not at the cost of the ecological features that already attract high numbers of visitors to coastal and marine areas. Those representing tourism and recreation interests should work with the marine planners and nature conservation advisors, ports, some shipping interests and other sectors to develop new opportunities for sustainable tourism and marine recreation.

Case Study 3: Development of **OFFSHORE RENEWABLE ENERGY** is a strategic aim of the Terra Rica Government and opportunities to develop wind and wave power are present within the Rica Sea. The National Marine Plan states that proposals for commercial scale offshore wind and marine renewable energy should be sited in the Plan Option Areas identified on the Opportunity Map for energy generation. Individual sites within these areas would be expected to be connected to each other, as necessary, and to the land as part of a bigger programme of infrastructure investment including subsea transmission cables and grid connections via distribution cables. Care will need to be taken not to cause undue problems for existing activities when developing this emerging sector within the Rica Sea.

THE MAP

The game is played in the fictional marine area called the 'Rica Sea',[19] represented graphically on a large table top game board (1.60 x 2.80 m), with a stylized map of the area.

The map shows a few parameters that should be taken into consideration while planning their economic and ecological functions. A few major international shipping lanes have already been established and sea depth is represented as light, medium and dark blue on the map. Wind farms can only be placed in light and medium blue areas, not white ones (deeper than 50 meters). The map also shows a few 'Opportunity areas' such as coastal and inland ports, cultural sites, historic wrecks, bird areas, populations of cetaceans, etc. Most of the sea area is underdeveloped but its sheltered location on the globe, proximity to nearby countries and ocean trading routes offers opportunities for maritime trade and marine activities.



[19] Rica Sea = Anagram for Rivers and Coastal Areas. Used with permission of European Parliament's Intergroup on Integrated Maritime Policy (SEARICA: Seas, Rivers, Islands and Coastal Areas).

BAYLAND MUNICIPALITY

For some, the world ends at the coast: for others, that's where it starts.

Key policy priorities: land-sea interactions, multi-modal transport connections to transfer freight from road to rail, energy transition (including to LNG for short sea shipping) and stakeholder engagement.

Particular local objective: to develop short-sea shipping routes that facilitate connections with hinterland and inland waterways as freight is expected to grow rapidly. Nearshore gas reserves are depleted so decommissioning or reuse of related infrastructure is possible.

Blue Growth focuses on beach and marine tourism, cruising and carbon capture and storage.

PENINSULAND LOCAL AUTHORITY

Humans do not live at sea.

Key policy priorities: multiple uses of space (co-location of activities), shipping & accessibility and investment in marine-related infrastructure.

Particular local objective: is to shorten transport routes at sea, provide for opportunities combining offshore functions with shipbuilding. Decision pending on whether to remove the locks from the Peninsula canal, thus facilitating passage of traffic between eastern and western port facilities.

Blue Growth objectives are cultivating fish and seaweed, wind energy and tourism. Cultural heritage on land an in the sea is seen as key to provide growth in this sector. A LNG terminal could be constructed in the main port.

ISLAND COUNCIL

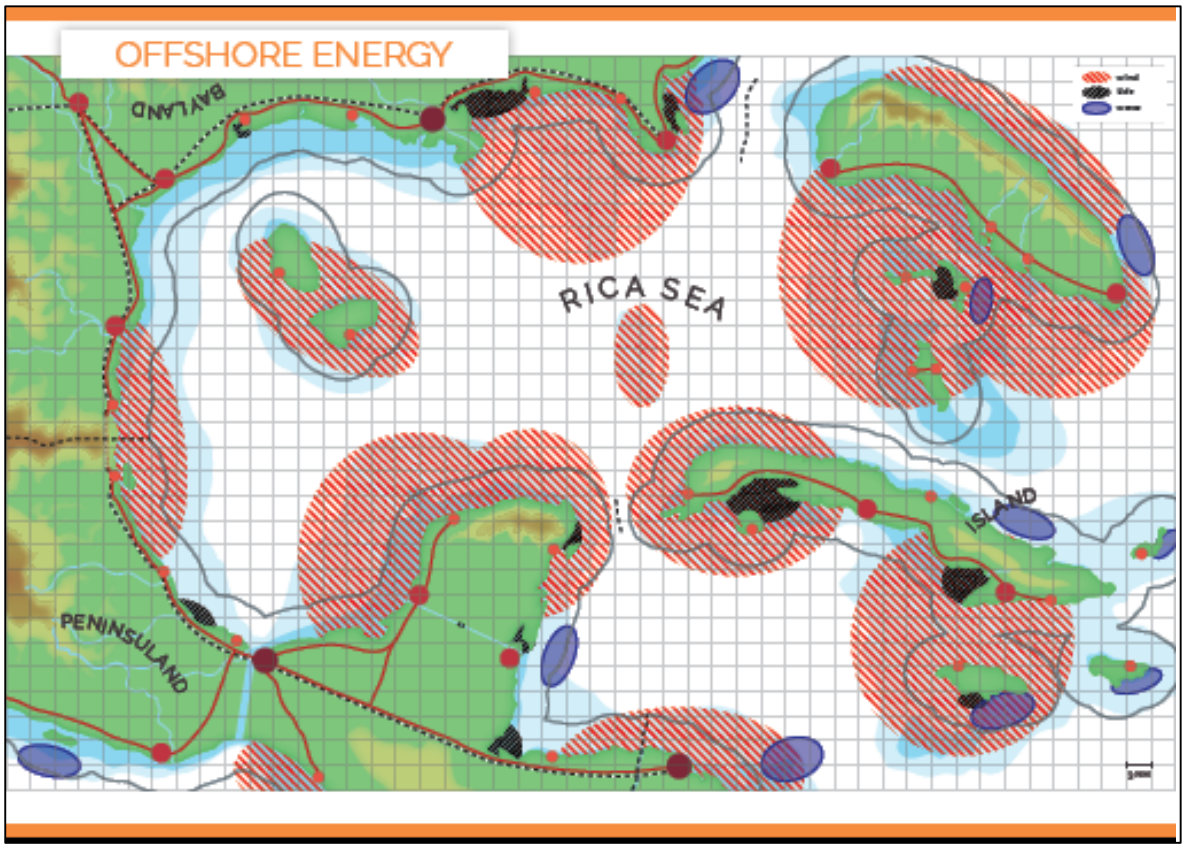
Blue growth happens in a blue environment.

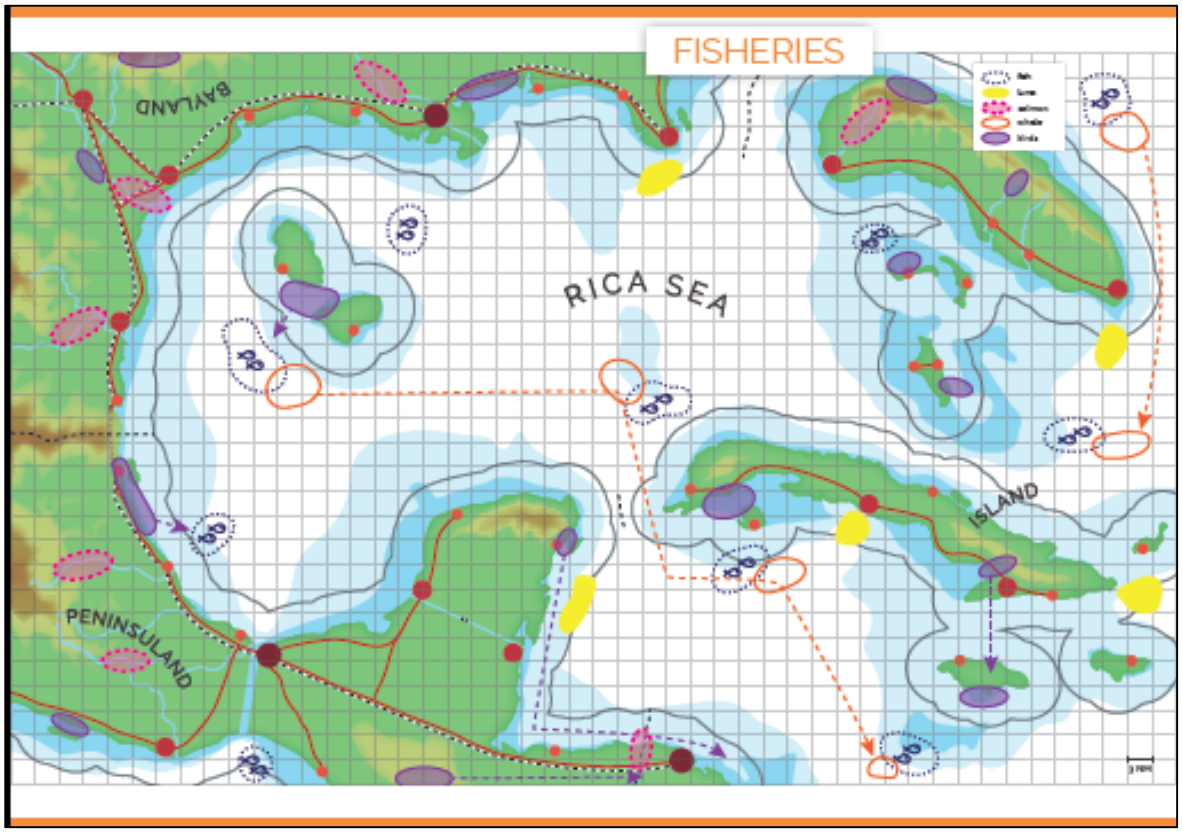
Key policy priorities: protect our resources, build with nature and innovate.

Particular local objective: to safeguard accessibility and secure lifeline ferry routes as well as becoming a world leader in sustainable fishing and in the super yacht industry.

Blue Growth opportunities are blue tourism (like diving and whale watching), deep sea mining and blue biotechnology. This calls for active and enhanced protection of marine life.

Annex 2: Examples of Opportunity Maps showing areas of resources & activities in the Rica Sea





Annex 3: Post-game Questionnaire

MSP Challenge Questionnaire

1. I am: Male / Female / Prefer not to say

2. Your age ...

	18 – 25
	25 – 35
	35 – 45
	45 - 55

	55 – 65
	65+
	Prefer not to say

3. Where do you live? .....

4. Where did you play the MSP Challenge session? .....

5. How did you hear about the MSP Challenge session? .....

6. In which sector do you (mainly) work?

- ☐ Public sector (e.g. government, public administration, public policy advice, etc.)
- ☐ Private sector (e.g. fishing, shipping, tourism, energy, consulting, etc.)
- ☐ Non-profit sector (e.g. science, NGOs, academia, etc.)
- ☐ Retired

7. On a scale of 0 – 10, to what extent are you professionally involved in marine planning?

0 = not at all; 10 = deeply involved

Please answer the following statements: *1 = strongly disagree; 5 = strongly agree*	Strongly disagree	Disagree	Neither agree nor	Agree	Strongly agree
7. I think it is easy to learn how to play the game	1	2	3	4	5
8. I enjoyed playing the game	1	2	3	4	5
9. The issues in the game represent the challenges in marine planning	1	2	3	4	5
10. I have become more interested in Marine Spatial Planning	1	2	3	4	5
11. I understand better what Marine Spatial planning is	1	2	3	4	5
12. I can better imagine the different viewpoints on Marine Spatial planning	1	2	3	4	5
13. I gained more insight into what the important factors in MSP are and how they (can) influence each other	1	2	3	4	5
14. I am likely to recommend this game to others	1	2	3	4	5

We would be interested in any further comments you might like to make. Please write them below.

.....

.....

Please give us your email address if you would like to receive the Clyde Marine Planning Partnership's newsletters, or sign up online at www.clydemarineplan.scot.

Email: .....

Thank you very much for your participation!

Annex 4: Extract from Crawford Paris's MSc Dissertation, 'Using Serious Games in Regional Marine Planning: An Innovative Stakeholder Engagement Pilot in the Clyde Marine Region'

"**4.3 Questionnaire Results**

The following section refers to ranked questions in the questionnaire provided at the end of each event.

4.3.1 General Responses

The overall response from across all three events (n = 36) showed positive feedback towards enjoyment of the game and how easy players found it to play, how it increased their understanding of MSP, and the extent to which they learned about its challenges. Question 6 in Table 4.4 refers to participant's level of involvement in MSP on a scale of 0 – 10 (see *****note below table for scale definitions). At each event, there tended to be at least one or two participants who had a higher level of involvement than most, indicated by the standard deviation (SD) of 2.15 (Question 6, Table 4.4). Level of involvement, however, was dominantly low across all three events with a mean of 1. As hypothesised, the lack of involvement in MSP appeared to have positive effects on the subsequent ranked questions related to learning. Across all three events, total scores showed that playing the game enhanced participant's interest in and understanding of MSP, as indicated by questions 9 – 13 where mean scores are ≥ 4.06. Although a minority did not find the game easy to learn (Question 7: mean, 4.09 and SD, 0.79), the general level of enjoyment of the game was positive, gaining the highest overall mean score of 4.65 (Question 8). Moreover, participants also agreed that they would be likely to recommend the game to others, perhaps as a result, with a mean of 4.42 (Question 14).

Table 4.4: Total ranked question responses from the questionnaire

		Question Number								
	Measure	6	7	8	9	10	11	12	13	14
Total	**Mean**	**1.00**	**4.09**	**4.65**	**4.44**	**4.06**	**4.18**	**4.21**	**4.12**	**4.42**
(N = 36)	±SD	2.15	0.79	0.60	0.75	0.75	0.68	0.69	0.54	0.61
	Min-Max	0-10	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
	Median	0	4	5	5	4	4	4	4	5
	Mode	0	4	5	5	4	4	4	4	5

Note: For Question 6: 0 = "Not at all" and 10 = "Deeply involved";

For Questions 7-14: 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neither agree nor disagree", 4 = "Agree", 5 ="Strongly Agree".

4.3.2 Testing for Relationships and Event Comparisons

As highlighted previously, the results combining all three workshops yielded mainly positive responses from the ranked questions. Subsequently, a series of Spearman's rank-order correlations were run in order to determine the existence of statistically significant relationships between paired variables from the total sample. The assumption that enjoyment of the game (Question 8) potentially led to participants recommending the game to others was proven correct across the sample, with a positive, strong correlation and statistically significant relationship (rs = 0.415, p = 0.016, Table 4.5). Additionally, overall level of enjoyment was also found to have a strong, positive correlation against participants gaining insight into factors and influences in MSP (Question 13), with a statistically significant relationship (rs = 0.402, p = 0.018, Table 4.6).

Table 4.5: Total sample correlations matrix (Qu. 8 and 14)

			I enjoyed playing the game	I am likely to recommend this game to others
Spearman's rho	I enjoyed playing the game (qu.8)	Correlation Coefficient	1.000	.415*
		Sig. (2-tailed)	.	**.016**
		N	34	33
	I am likely to recommend this game to others (qu.14)	Correlation Coefficient	.415	1.000
		Sig. (2-tailed)	**.016**	.
		N	33	33

* Correlation is significant at the 0.05 level (2-tailed)

Table 4.6: Total sample correlations matrix (Qu. 8 and 13)

			I gained more insight	I enjoyed playing the game
Spearman's rho	I gained more insight (qu. 13)	Correlation Coefficient	1.000	.402*
		Sig. (2-tailed)	.	**.018**
		N	34	34
	I enjoyed playing the game (qu.8)	Correlation Coefficient	.402	1.000
		Sig. (2-tailed)	**.018**	.
		N	34	34

* Correlation is significant at the 0.05 level (2-tailed)

The questionnaire feedback indicated that participants generally gained a better understanding of MSP as a result of playing the game (Question 11, mean = 4.18, Table 4.4). It will, hence, be important to test the effects of this (V_1) against other potentially relatable variables. Further Spearman's rank-order correlations were run in order to test the effects of V_1: against participants gaining interest in MSP ($V_1 – V_2$); against participants having a better understanding other viewpoints in MSP ($V_1 – V_3$); against participants gaining insight into MSP factors and influences ($V_1 – V_4$) and; against likeliness to recommend the game to others ($V_1 – V_5$). Tables 4.7 – 4.10 show the results from each test, all of which have strong,

positive correlations with statistically significant relationships (respectively, rs = 0.550, p = 0.001; rs = 0.526, p = 0.002; rs = 0.615, p = 0.000, rs = 0.491, p = 0.004). On an individual event basis, these combined variables proved strongest at Workshop 3, each showing dominant statistically significant relationships (V_1 – V_2, V_1 – V_3, V_1 – V_4 and V_1 – V_5: p = 0.000). However, Workshop 2 had no significant relationships between these combinations and Workshop 1 showed only one (V_1 – V_2: rs = 0.764, p = 0.046, Table 4.11).

Table 4.7: Total sample correlations matrix for Qu. 11 and Qu. 10 (V_1 – V_2)

			I better understand what MSP is	I have become more interested in MSP
Spearman's rho	I understand better what MSP is (qu.11)	Correlation Coefficient	1.000	.550**
		Sig. (2-tailed)	.	**.001**
		N	33	32
	I have become more interested in MSP (qu.14)	Correlation Coefficient	.550**	1.000
		Sig. (2-tailed)	**.001**	.
		N	32	33

** Correlation is significant at the 0.01 level (2-tailed)

Table 4.8: Total sample correlations matrix for Qu. 11 and Qu. 12 (V_1 – V_3)

			I better understand what MSP is	I have become more interested in MSP
Spearman's rho	I understand better what MSP is (qu.11)	Correlation Coefficient	1.000	.526**
		Sig. (2-tailed)	.	**.002**
		N	33	33
	I can better imagine the different viewpoints on MSP (qu.12)	Correlation Coefficient	.526**	1.000
		Sig. (2-tailed)	**.002**	.
		N	33	34

** Correlation is significant at the 0.01 level (2-tailed)

Table 4.9: Total sample correlations matrix for Qu. 11 and Qu. 13 (V_1 – V_4)

			I better understand what MSP is	I gained more insight
Spearman's rho	I understand better what MSP is (qu.11)	Correlation Coefficient	1.000	.615**
		Sig. (2-tailed)	.	**.000**
		N	33	33
	I have become more interested in MSP (qu.14)	Correlation Coefficient	.615**	1.000
		Sig. (2-tailed)	**.000**	.
		N	33	34

** Correlation is significant at the 0.01 level (2-tailed)

Table 4.10: Total sample correlations matrix for Qu. 11 and Qu. 14 ($V_1 – V_5$)

			I better understand what MSP is	I am likely to recommend this game to others
Spearman's rho	I understand better what MSP is (qu. 11)	Correlation Coefficient	1.000	.793**
		Sig. (2-tailed)	.	**.000**
		N	17	17
	I have become more interested in MSP (qu. 14)	Correlation Coefficient	.793**	1.000
		Sig. (2-tailed)	**.000**	.
		N	17	17

** Correlation is significant at the 0.01 level (2-tailed)

Table 4.11: Workshop 1 sample correlation matrix for Qu. 11 and Qu. 10 ($V_1 – V_2$)

			I better understand what MSP is	I have become more interested in MSP
Spearman's rho	I understand better what MSP is (qu. 11)	Correlation Coefficient	1.000	.764*
		Sig. (2-tailed)	.	**.046**
		N	7	7
	I have become more interested in MSP (qu. 14)	Correlation Coefficient	.764*	1.000
		Sig. (2-tailed)	**.046**	.
		N	7	7

* Correlation is significant at the 0.05 level (2-tailed)

Table 4.12: Question-by-event matrix of ranked answers from the questionnaire

			Question Number								
		Measure	6	7	8	9	10	11	12	13	14
Event location	Workshop 1 (Glasgow) N = 7	**Mean**	**1.00**	**4.09**	**4.65**	**4.44**	**4.06**	**4.18**	**4.21**	**4.12**	**4.42**
		±SD	2.15	0.79	0.60	0.75	0.75	0.68	0.69	0.54	0.61
		Min-Max	0-10	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
		Median	0	4	5	5	4	4	4	4	5
		Mode	0	4	5	5	4	4	4	4	5
	Workshop 2 (Lamlash) N = 10	**Mean**	**1.43**	**4.10**	**4.50**	**4.10**	**3.80**	**4.44**	**3.80**	**4.00**	**4.11**
		±SD	1.99	0.57	0.71						
		Min-Max	0-10	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
		Median	0	4	5	4	4	4	4	4	4
		Mode	0	4	5	4	4	4	4	4	4
	Workshop 3 (Greenock)	**Mean**	**0.61**	**4.29**	**4.59**	**4.53**	**4.25**	**4.29**	**4.47**	**4.24**	**4.53**
		±SD	2.15	0.69	0.62	0.80	0.77	0.69	0.62	0.66	0.51
		Min-Max	0-10	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
		Median	0	4	5	5	4	4	5	4	5
		Mode	0	4	5	5	5	4	5	4	5

*Note: For Question 6: 0 = "Not at all" and 10 = "Deeply involved"
For Questions 7 – 14: 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Neither agree nor disagree", 4 = "Agree", 5 = "Strongly Agree".

Table 4.12, above, gives a question-by-event breakdown of the total ranked responses in Table 4.4, providing further detail of overall scores from each workshop. These scores are also attributed to the series of graphs illustrating individual participant's ranked responses to questions 7 – 14. Workshop 1 yielded a mixed response to Question 7, with 2 participants disagreeing that the game is easy to learn how to play, hence why it scored a mean of 3.57 and an SD of 1.13. By contrast, Workshops 3 had 10 more participants, with 6 strongly agreeing, 8 agreeing and none specifically disagreed to this. Interestingly, the mean score and SD for Question 7 in Workshop 3 is identical to that in Question 11, which relates to gaining a better understanding of what MSP is, with both scores at 4.29 and 0.69 respectively. Similarly, this is also true for Workshop 1, which has the same mean score of 3.57 for both Question 7 and 11. This suggested a possible relationship between how easy participants find it to learn how to play the game and their ability to gain an understanding of what MSP is as a result of playing. A Spearman's rank-order correlation was run for both questions (7 and 11) for Workshops 1 and 3 to determine this, however, both were revealed as statistically insignificant ($p = 0.730$ and $p = 0.088$, respectively, where p is statistically significant at ≤ 0.05). Workshop 2 received generally lower mean scores across most questions, particularly number 12 which asks about better imagining different viewpoints (mean = 3.80, SD = 0.63). This is contrasted by question 11, relating to gaining a better understanding of MSP, which received the highest mean score compared to Workshops 1 and 3. Although all workshops received mainly positive questionnaire feedback, a significant observation must be noted with respect to Workshop 3 consistently gaining the highest overall mean responses (mean $\geq$ 4.24) from the lowest overall mean level of involvement in MSP (mean = 0.61)."