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Exploring an integrated approach towards a sustainable blue economy

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Forewords

Foreword from Professor Colin Galbraith, Chair of JNCC

It was a privilege to be invited to provide some opening remarks to the workshop on “Exploring an integrated approach towards a sustainable blue economy”, held online on 2 and 3 November 2022. I am delighted now to have the opportunity to provide some words of introduction to this report, which reflects the discussions from that workshop.

Firstly, let me thank the Scottish Government for jointly hosting the event along with JNCC. JNCC is keen to partner with other agencies and organisations in order to bring people together to exchange ideas and to look at practical actions that will lead to a more sustainable marine and terrestrial economy. Indeed, this workshop was an excellent example of this approach and how it can help to support the transition to a sustainable blue economy through sharing knowledge and ideas, looking for synergies and shared interest across the UK and internationally, and providing important opportunities to discuss new partnerships and collaborations.

In considering the move to a sustainable blue economy, it is important to take a holistic approach, especially in light of the rapidly increasing climate change that is bringing profound change to the marine environment across the UK and globally. These impacts and rapid changes add to pre-existing direct pressures on the marine ecosystem – such as overfishing at the global level, pollution and poorly planned coastal developments - that impact on nature’s ability to sustain us in the long term.

It is important also to highlight the growing public interest in seeing the health of our oceans improve, and the wider awareness of the need for action to help nature recover. Seeking a new way to work with the marine environment that is low in carbon, low in impact and high in nature is key to delivering true sustainability for the future. Indeed, it is just such an approach, underpinned with data, information and advice, that we plan to take in the new JNCC Strategy to be launched in the spring of 2023, linking nature recovery in the marine environment to the economy and to our wellbeing.

The blue economy workshop was originally scheduled to be held in Scotland - the first of the UK nations to set out a blue economy vision - but travel disruption prevented an in-person meeting being held. It is important to take opportunities to highlight what is being done in the marine environment in all parts of the UK as exemplars to each other in terms of what can or should be done to enhance sustainability. Adopting a can-do approach, trying a range of approaches to managing the marine system and accepting that perhaps not everything will work is important. The discussions that took place at the workshop highlighted the need to focus on practical solutions and to be clear on the desired outputs and outcomes. In that regard, the Scottish Government’s Blue Economy Vision is a particularly important leadership document and approach.

Looking ahead, it is critical that we continue to learn from other countries across the world in terms of how they are managing the marine environment. What does good practice look like in reality, and how can we understand the bigger global picture that provides context for actions across the UK?

The workshop addressed all the issues mentioned above; hence this report is an important document, informing future management and considering the practical actions that are needed to tackle the twin emergencies of nature loss and climate change impacts in the marine environment. This is set within a period of considerable economic uncertainty and ever-changing pressures on the marine environment. The report also considers the urgent

need to work together in new and innovative ways to tackle these issues, and highlights what is required and what is possible now. Overall, my view of our priorities as we move forward can be summarised as:

- To identify what we know about marine ecosystems and what we still need to understand.
- To identify the benefits and challenges of developing a sustainable blue economy.
- To understand how we can plan and work together to develop a wider vision for a sustainable blue economy – what are the key actions needed?
- How should we communicate effectively across agencies and with the wider public to highlight the key needs for the future?

I would also like to highlight some key messages and points that came out loud and clear from the workshop discussions and that resonate with lessons from my own experience some decades ago when completing a PhD on avian predators and mussel farming in the west of Scotland.

Firstly, having a detailed knowledge of how to manage the marine ecosystem is key.

Secondly, specialist knowledge and science are fundamental to understanding ecosystem processes and to underpinning action with clear and objective data, information and advice.

Thirdly, having a clean and ‘healthy’ marine system is a fundamental prerequisite for a sustainable economy.

Fourthly, that people are an inherent part of the system; that differing views on priorities can be useful and that mechanisms need to be developed to identify management options and priorities overall.

And fifthly, that effective communications - explaining what is being done, seeking views and being open about any uncertainties - is important to gain trust and engagement from others.

Finally, let me encourage you to read this report and to participate in future discussions about the marine environment and how we can move to a sustainable blue economy across the UK in future. Such change will not happen without your support and involvement.

Foreword from Aoife Martin, Deputy Chair NatureScot and JNCC member

I was delighted to attend the recent workshop on “Exploring an integrated approach towards a sustainable blue economy”, and I am equally delighted to write a foreword for this conference report. As Deputy Chair of NatureScot, I make no apologies for presenting this from a Scottish perspective. Scotland is a strong advocate for championing the importance of the blue economy to the nation’s future prosperity. In March last year, Scottish Government published its Blue Economy Vision which sets out the long-term ambition for Scotland to 2045. And it is no surprise that we are embracing this challenge – our marine environment is seven times larger than our land mass, blue carbon storage in Scottish seas is at least equivalent to carbon storage on land, 60% of UK seafood landings come from Scottish waters, and the marine economy contributed £5 billion in gross value added to the Scottish economy in 2019.

It is also unequivocal that a marine environment that is restored and resilient to climate change and is sustainably managed is key to tackling the wider climate and nature crises.

However fully realising the benefits that the blue economy can provide is challenging, and much work still needs to be done to understand how we can deliver collectively on economic, political, social and cultural growth while maintaining a sharp focus on protecting and restoring biodiversity and responding to the climate emergency. What is clear is that the potential failure of a siloed approach is writ large – and success lies in taking an integrated and holistic approach.

Taking an integrated blue economy approach recognises that this is not about environment protection pitched against economic growth – both are needed, and the ambition is for shared stewardship of marine natural capital.

An integrated blue economy approach means we need to enable ‘use’ of the resource, but we want a ‘use’ model where industries are nature positive, focused on net zero commitments, and are supported to adapt and remain resilient for the future. And we must actively promote that our marine environment is managed to deliver meaningful benefits to communities, so they value our marine and freshwater resources – and that doesn’t just apply to coastal communities.

Valuing and embedding a blue economy approach is an ambitious task and it is why we need to work collaboratively across government, businesses and communities to share ideas, knowledge and experience. This report is a significant contribution to that agenda.

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1. Introduction

1.1. What is a sustainable blue economy?

Marine ecosystems are facing biodiversity loss in multiple dimensions. Anthropogenic pressures such as overfishing, eutrophication, climate change, habitat destruction, plastic pollution and invasive alien species are threatening ecosystem structure and functioning, and the provision of the ecosystem services upon which much of human existence depends.

Under ‘business as usual’, countries develop their ocean economies through the exploitation of marine resources – for example, through commercial fishing, shipping, oil, gas and mineral development. The limitations of the marine space mean that these human activities are pitted together in competition over the use of these resources, putting pressures on ocean ecosystems and impacting their future health and productivity.

So ‘business as usual’ has to change.

There is an emerging narrative – sometimes referred to as the sustainable ‘blue economy’ - that promotes taking a holistic vision when managing our oceans. Like the ‘green economy’, the sustainable blue economy is a triple bottom line approach which balances economic, social and environmental objectives in order to bring human well-being, sustainable livelihoods, equitable prosperity and environmental sustainability into harmony.

Although there is no globally agreed terminology or definition, the blue economy strategies and policies emerging across the world share a common understanding of the need to develop an integrated framework to guide the sustainable use of the ocean and coastal resources to deliver economic growth, environmental protection, and equity and social wellbeing in a way that best suits local contexts.

1.2. The benefits of a sustainable blue economy

While there is an acknowledged need for a stronger evidence-base, there is growing understanding of the key role that a sustainable and healthy blue economy can play in the future prosperity and security of nations. For the UK, this can be summarised as:

- **Food security** – ‘Blue’ animal-based foods are highly nutritious compared to terrestrial equivalents, and if sustainably produced lead to less pollution and use fewer resources. There are increasing opportunities for sustainable aquaculture of fish and shellfish.
- **Energy security** – Ocean technologies provide significant opportunity to meet the UK’s energy needs, with the recent British Energy Security Strategy targeting to deliver 50GW offshore wind capacity by 2030, which is about 65% of the UK’s total generation capacity in 2021 (BEIS 2022).
- **Mitigation of, and adaptation to, climate change** - The ocean has sequestered 25% of cumulative CO₂ emissions since 1850 (Friedlingstein *et al.* 2019). Healthy coastal ecosystems also provide protection from natural hazards, coastal erosion, and rising sea levels - the latter being a key risk for UK as it is estimated that the annual likelihood of coastal flooding will increase between 37% and 178% due to sea level rise (Ondiviela *et al.* 2014, Edwards 2017, de Moraes *et al.* 2022).
- **Coastal tourism, leisure, and recreation** – UK coastal tourism generates about £8bn in overnight spend and day spend (National Coastal Tourism Academy 2017). Marine users benefit from several cultural services provided by healthy marine ecosystems;

evidence shows that there is increased well-being and aesthetic pleasure associated with the places tourists visited and practices they carried out (Ainsworth *et al.* 2019).

- **Co-location** of the above services provides opportunities for additional benefits and/or more cost-effective solutions.
- **Nature conservation** in the marine environment, as the valuation of nature and integration in decision-making allows for a more targeted and efficient delivery of conservation targets.
- **Trade and transport** – 95% of the UK's trade passes through its ports, and activities are likely to increase with global maritime trade volumes set to triple by 2050 (OECD 2019). There is scope to make shipping more sustainable.
- **Economic growth and jobs** – The UK marine sectors account for 8.1% of the UK's Gross Value Added and 6.1% of the UK's output (Stebbings *et al.* 2020). With the right governance, policy and investments, the sustainable blue economy could outperform the growth of the global economy, both in terms of value added and employment (OECD 2016).
- **Health and wellbeing** – Human physical and mental health and well-being can be promoted through positive interactions with the coasts and oceans, necessitating accessible, clean, and safe coastal settings (Borja *et al.* 2020).

1.3. The importance of an integrated approach

Having embraced the principle of a blue economy, there are different transition pathways to achieving the goal of ocean sustainability. The challenge is to identify the optimal pathway that achieves economic, political, social, and cultural growth for a country without losing the focus on sustainability, and while ensuring that the in-combination and cumulative impact of policies and activities are well understood and managed.

Such a transition requires systemic change and embracing a new transdisciplinary approach to problem solving, where multiple disciplines are working together with users and stakeholders, and where the dynamic and complex relationship and dependencies between nature, economy and people are accounted for.

This approach requires the consideration of the three key 'triple bottom line' dimensions when setting the vision, mission, and action plan towards achieving ocean sustainability:

- **Economy** – ensuring sustainable development that increases food and energy production, promotes development and innovation across sectors, improves the quality of jobs in the ocean sector, and benefits coastal communities, without putting extra pressure on marine ecosystems.
- **Environment** – ensuring effective protection of marine assets and enabling nature's recovery to halt and reverse global declines in biodiversity, as well as to mitigate and adapt to climate change.
- **Society** – ensuring the wealth created through our transition to a sustainable economy is equitably distributed, coastal communities have a voice in decision-making, human-wellbeing and livelihoods are improved, diversity is promoted via equal opportunities generated, and gender equity is achieved.

It also requires addressing the challenges and issues presented by governance, developing the evidence base for decision making, and having appropriate systems in place to measure progress:

- **Governance** – Understanding the governance challenges that could put at risk the potential benefits of a resilient and healthy marine ecosystem is vital. The marine environment is a complex, interconnected system. The increasing interactions between different government policies such as net zero, environmental protection and

restoration, and biodiversity loss targets means there is a risk of misalignment and/or competition instead of collaboration to deliver integrated aims and objectives towards achieving ocean sustainability. As different government departments control, regulate and manage the various activities/functions within the marine environment in a fragmented manner, there is a challenge around lack of consistency, alignment and delivery of policy objectives and implementation, and potentially inefficient use of public resources (Table 1).

Table 1. Governance-related challenges and risks to ocean sustainability.

Challenge	Risk
Uncoordinated development of sectors	<i>Ad hoc</i> development on the coast and near shore areas can lead to significant externalities between sectors (that is, where sectors do not have to carry the costs of the impacts they create), suboptimal siting of infrastructure, overlapping uses of land and marine areas, marginalisation of deprived communities (many of which are coastal), and loss or degradation of critical habitats (World Bank 2016). The limitations of the marine space mean that without a framework that coordinates the development of these activities (building on their synergies), they compete for the use of space, natural assets, and workforce skills.
Policy risks	Increasing interactions between different government policies - such as net zero, environmental protection and biodiversity loss targets – bring a risk of policies clashing with each other rather than working together to deliver integrated aims towards achieving ocean sustainability. The UK's existing marine planning frameworks were designed to balance competing demands in a piecemeal way, rather than prioritise them within context, leading to unintended consequences. The current UK frameworks overlook in-combination and cumulative impacts (but also opportunities) of various activities, as these are poorly understood, and the evidence required to make integrated decisions is often lacking.
Uncoordinated approaches to achieving ocean sustainability	While there is a broad consensus of what the ethos of a sustainable blue economy is trying to achieve, there is no agreed definition of the term, and often similar terms such as 'ocean economy' or 'marine economy' are used synonymously without clear definitions (Wenhai <i>et al.</i> 2019). Countries are often making decisions according to their own needs, particularly in terms of the management of impact, data access, monitoring, and product development (Wenhai <i>et al.</i> 2019). Closer alignment of concepts and definitions would help to achieve shared goals and maximise the impact of policies aimed at ocean sustainability, as well as bringing efficiency and confidence to the sectors which operate between countries.

- **Evidence base** – Data and multi- and transdisciplinary evidence and approaches will be key to understanding the impacts of pressures and how solutions can be targeted to ensure economic activity is in balance with the long-term capacity of ocean ecosystems (Lee *et al.* 2020). Many of the current blue economy strategies are exploring the role and potential of natural capital methods to improve decision-making on sustainability issues. This would mean identifying marine systems as components that interact in non-linear, path dependent ways, with lock-in and feedback loop mechanisms, and unpredictable effects across scales (Bigagli 2017).

- **Monitoring and evaluation** – Putting in place adequate monitoring and evaluation systems for measuring progress and reporting is a fundamental requirement of good governance.

1.3.1. Mobilisation of financial investment

Additional to all the above, the goals of a sustainable blue economy will only be achievable if the appropriate finance mechanisms are established. The transition to a sustainable blue economy will involve significant costs, that neither the public nor private sector will be able to bear alone. Financing the costs of transition will involve identifying the financial levers, reforms and incentive structures required to achieve a cost-effective transition pathway (see sections 2.5 and 3.5). This would mean that financing for decarbonisation and nature-based solutions will be incorporated into this bigger financial framework supporting ocean sustainability. Additionally, it will be necessary to fully account for the potential economic risk involved in no action, to justify transition.

1.4. What is the current state of play on the blue economy in the UK?

The UK Government’s current stated vision for the marine environment was developed over a decade ago, before understandings of ocean sustainability and the blue economy had started to develop in their current sense. Thus, although for its time it was progressive and ambitious in its attempt at a more integrated approach, it is more sectoral than the blue economy visions that are emerging today, and there are suggestions that it should be updated. Nevertheless, the existing UK Marine Policy Statement does provide a framework within which each of the devolved nations can work towards their own blue economy goal (Table 2).

Table 2. Overview of the UK policy context for ocean sustainability.

The UK vision for the marine environment , set out in 2002 (and confirmed in the 2011 UK Marine Policy Statement), is for “clean, healthy, safe, productive and biologically diverse oceans and seas”.
The UK high-level marine objectives (April 2009) define the broad outcomes for achieving this vision: achieving a sustainable marine economy; ensuring a strong, healthy and just society; living within environmental limits; promoting good governance; using sound science responsibly.
The UK Marine Policy Statement (2011) provides the context and high-level policy framework for the preparation of Marine Plans by the devolved administrations, and for decision making affecting the marine environment.
The national and sub-national Marine Plans put the objectives for the marine environment and UK Marine Strategy into practice.
Other relevant strategies and programmes that touch the marine space at a UK level include: the 25 Year Environment Plan , UK Marine Strategy , UK Marine Science Strategy , Joint Fisheries Statement , UKRI Sustainable Management of UK Marine Resources (SMMR) programme, the Natural Capital and Ecosystem Assessment Programme , and the Dasgupta review on accounting for nature in economics and decision-making.

In 2022, Scotland became the first of the UK nations to set out a [blue economy vision](#) (Marine Scotland 2022) (see 1.4.1), but the other nations are also progressing work in this space, at both national and regional level.

Examples in England include the Marine Pioneer (see 2.4); the Restoring Meadow, Marsh and Reef ([ReMeMaRe](#)) project; the South West Partnership for Environmental and Economic Prosperity ([SWEEP](#)), and the Championing Coastal Coordination ([3Cs](#)) initiative.

In Wales, the [2015 Wellbeing of Future Generations Act](#) makes the commitment to resilient ecosystems, with other relevant developments including the [State of Natural Resources Report 2020](#); the [Welsh Marine Evidence Strategy](#); Blue Recovery work towards 'resilient marine ecosystems' that support social, cultural, economic and environmental outcomes; and the [Wales Coast and Seas Partnership](#) focussed on ocean literacy, coastal community building and sustainable finance.

In Northern Ireland, the NI Government has completed consultation on its [Green Growth Strategy](#), and a Blue Carbon Action Plan is under development to protect and restore blue carbon habitats.

While the focus of this report is on the UK, it is relevant to also mention the ongoing initiatives in the UK Overseas Territories (UK OTs). In 2022, the British Virgin Islands became the first UK OT to establish a blue economy policy, while the UK Government's [Blue Belt Programme](#) aims to assist the UK OTs in protecting and enhancing ocean health to halt biodiversity loss, enable sustainable growth, ensure climate change resilience, and to connect people with the natural environment.

1.4.1. A Blue Economy Vision for Scotland

Scotland's [Blue Economy Vision](#) (Box 1) (Marine Scotland 2022) is centred on the acknowledgement that its "marine, coastal and interlinked-freshwater resources are national assets and part of Scotland's cultural identity that has shaped our economy. For these habitats to continue to play this important role in lives and livelihoods, we must manage, protect, and enhance these ecosystems to achieve long-term health and sustainability".

Box 1. A Blue Economy Vision for Scotland

"By 2045 Scotland's shared stewardship of our marine environment supports ecosystem health, improved livelihoods, economic prosperity, social inclusion and wellbeing." (Marine Scotland 2022)

The vision identifies six long-term 'Blue Economy Outcomes' (Figure 1), which are focussed on environmental, economic and social objectives. These outcomes are being used to help provide focus on areas for investment and establish shared goals with stakeholders in the public, private and third sectors. They also have an important role in providing a context for the development and delivery of existing strategies and plans, and to inform areas of development such as the new Biodiversity Strategy (which encompasses both terrestrial and marine environments), the Energy Strategy, and future updates to the Climate Change Plan.

Crucially, Scotland's Blue Economy Vision is an integrated approach in that it:

- provides the context for all marine-related activity across the Scottish Government;
- supports a greater cohesion of policies;
- is helping to guide its national and international marine ambitions;

- is consistent with the vision defined within the UK Marine Policy Statement;
- offers framing for Scotland's own existing and future marine management policies, strategies and plans, such as Scotland's National Marine Plan and Future Fisheries Management Strategy; and
- sits alongside other existing high-level government strategies, such as the Environment Strategy, The National Plan for Scotland's Islands and the National Planning Framework, and Scotland's National Strategy for Economic Transformation.

The steps being taken to begin to put the vision into practice are outlined in section 3.1.

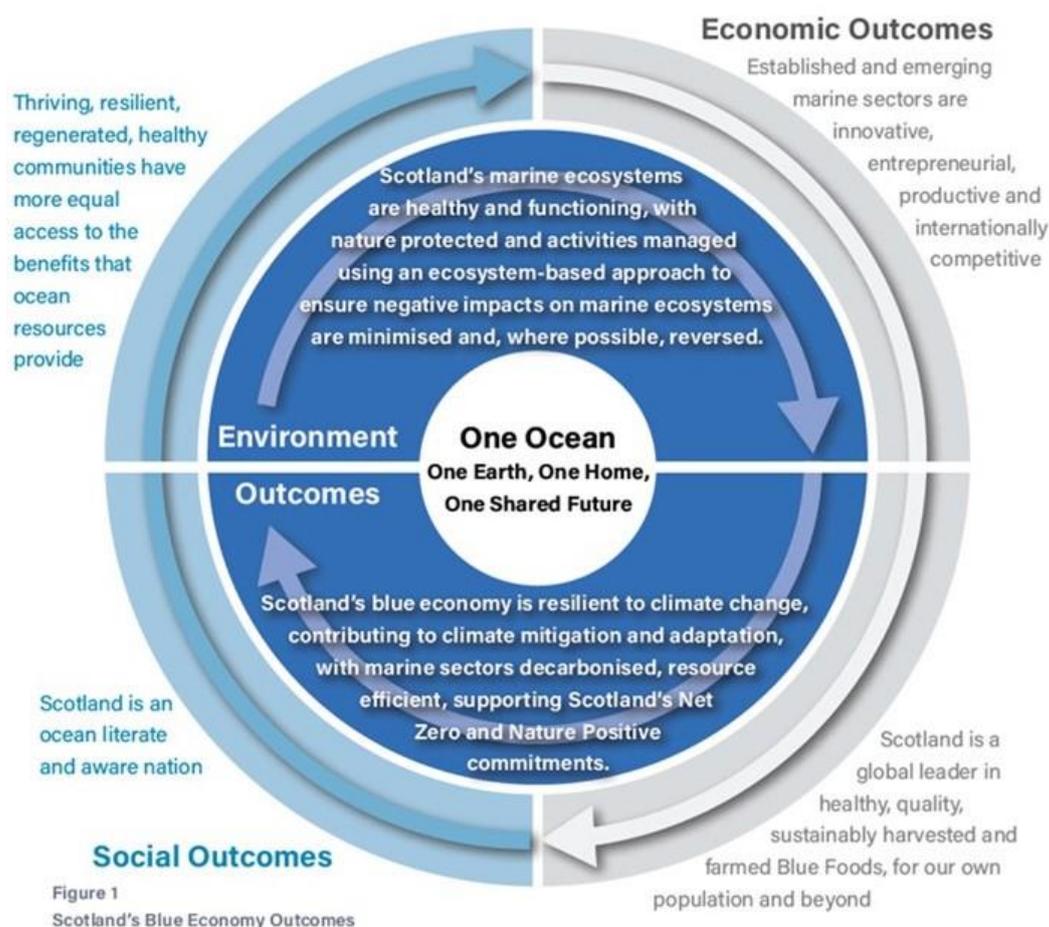


Figure 1. Scotland's 'Blue Economy Outcomes' (© Scottish Government - public sector information licensed under the Open Government Licence v3.0).

1.5. Working together on our next steps

There is a tremendous amount of energy and work being devoted across the UK nations to developing blue economy thinking and practice. However, despite a shared goal, there is currently no established forum for collaboration, knowledge exchange and identifying best practice.

In November 2022, the Scottish Government and JNCC co-hosted an online workshop called "Exploring an integrated approach towards a sustainable blue economy". Attended by representatives of UK governments and conservation bodies, academics, and business and finance partners, the workshop aimed to explore a blue economy approach that accounts for the dynamic and complex relationship between nature, economy and people, and to discuss

how it can contribute towards a holistic and more efficient strategy to deliver net zero and other UK targets and ambitions.

Specifically, it sought to:

- identify approaches that could integrate and achieve the ambitions of Scotland, England, Wales and Northern Ireland, which would enhance outcomes for planet, people and economy;
- identify cost effective pathways to delivering UK targets and ambition through adequate financing vehicles that generate, invest, align and account for financial capital to achieve sustained ocean health and governance;
- build our knowledge and understanding of new concepts by enabling healthy exchange of ideas, as well as strengthening partnerships on marine sustainability across the UK.

The presentations and ensuing discussions are revisited in the following sections, written by the speakers at the workshop. Together, they provide an overview of current thinking on the blue economy and experiences of implementation, drawing from activity within the UK and internationally as a first step towards facilitating further work and collaboration on ocean sustainability for the whole of the UK.

2. Contributor essays: Critical factors for achieving an integrated blue economy

2.1. Common characteristics of sustainable blue economy strategies around the world, by Eugenia Merayo, JNCC

As a first step towards ocean sustainability, an increasing number of countries are defining and starting to implement blue economy strategies, as an opportunity to foster economic growth, improve livelihoods and protect nature. A comparative analysis of blue economy strategies around the globe carried out by JNCC allows us to discuss commonalities across countries transitioning towards sustainability in the marine space. Eight strategies were reviewed, from the Ocean Panel, European Union, Bermuda, British Virgin Islands, African Union, Seychelles, India and Canada. Our analysis focussed on identifying their common principles, priority sectors and governance mechanisms.

2.1.1. Principles and priority sectors

Based on our analysis, the key principles shared by the different sustainable blue economy strategies are the following.

- **Decision making to be based on data, and multi- and transdisciplinary evidence and approaches.** These are key to understanding the impacts of pressures and how to balance economic activity with the long-term capacity of ocean ecosystems (Lee *et al.* 2020). Many existing strategies are exploring the role and potential of natural capital methods to improve decision making.
- **The need to invest in innovative technologies to help the transition to a sustainable blue economy.** Rapid scientific and technological advances - such as innovations in advanced materials, subsea engineering, sensors and imaging, satellite technologies, computerisation, and big data analytics - could have an impact on the development of marine activities as well as help address the environmental challenges faced by the ocean.
- **Sustainable innovation financing mechanisms.** Transition to a sustainable blue economy will involve significant costs that will require sustainable innovation financing mechanisms, especially blended (i.e. public-private partnerships).
- **Alignment with climate change targets.** These strategies are in alignment with climate change targets, in accordance with the growing recognition of the ocean's role in mitigating and responding to climate change. Researchers have estimated that ocean-based solutions can contribute a reduction of up to 20% of the required emission gap to remain in the 1.5C pathway under the 2015 Paris agreement (Hoegh-Guldberg *et al.* 2019).
- **Protection of ocean health.** Many of the strategies recognised that sustainable growth of our ocean sectors is reliant on a healthy functioning marine ecosystem, and protection of the health of the ocean is essential for prosperity.
- **Balancing economic, social, and environmental objectives.** As reflected in this review, there's increasing recognition that a sustainable ocean economy should respect the environment, protect human rights, improve human well-being, stimulate inclusion, and gender equity, as well as facilitate equal access to resources and benefits to provide fair opportunities consistent with sustainable development (Osterblum *et al.* 2020).
- **Addressing the skills gap.** Transitioning to a sustainable blue economy will lead to structural changes in the economy, such as job losses and creation of new employment opportunities in emerging sectors (e.g. ocean renewable energy).

Therefore, measures will need to be taken by government and businesses to build capacity and upskill and reskill the workforce.

- **Consistency with existing international agreements.** They align with and support the Sustainable Development Goals, multilateral environmental agreements such as the CBD's Global Biodiversity Framework and other international commitments, highlighting the need to balance the economic, social, governance and environmental dimensions of sustainable development in relation to oceans (Lee *et al.* 2020).

The blue economy strategies that we analysed identified a range of activities and sectors in the marine environment that are seen as a priority, both traditional and new. These include fisheries and aquaculture, tourism, shipping and ports, ocean conservation and MPAs, ocean renewable energy, and new industries such as carbon storage. They also incorporate other traditional sectors such as cables and aggregate dredging, provided they can be exploited sustainably.

2.1.2. Governance

In the blue growth agenda, there is a risk that marine spatial planning becomes a technical issue, focussed on the allocation of spaces rather than on good governance (Flannery 2019). Strategies are then needed to build strong governance. Our review highlights the main governance approaches and principles that are common across the eight strategies analysed:

- The use of marine spatial planning and ecosystem-based management tools.
- The use of ecosystem services and natural capital approaches and accounting.
- The importance of cross-sectoral coordination and planning within the government to improve efficiency.
- Governance mechanisms that are integrated, flexible and transparent, and allow for quick reaction to a changing environment.
- Stakeholders who are actively involved in the decision-making process.
- Collaboration at both regional and international levels, with other governments and institutions, including research centres and multilateral fora.
- Fostering innovative financial solutions that are also sustainable and can fund the transition to a sustainable blue economy, in partnership with the private sector.

2.1.3. What next?

This is an ever-moving picture, as countries around the world actively develop blue economy strategies as a way of developing their economies while protecting their natural resources at the same time. While there are many regional differences, there is much commonality in terms of the concepts (even though there is not a single definition) and tools being used. However, while these strategies are a very important first step, the biggest challenge of all is how these strategies will be implemented and what a blue economy will look like in practice.

2.2. The systems thinking approach for marine sustainability, by Professor Mel Austen, University of Plymouth

2.2.1. What is systems thinking?

Systems thinking, at its most basic level, is about bringing together the different academic disciplines and stakeholder perspectives in broader thinking to approach environmental and societal problems and identify sustainable solutions. Systems thinking seeks to gain a wider and in-depth understanding that enables the co-development and production of solutions with the multiple and interacting actors who need to be engaged and involved.

There are many slightly different, but very similar, definitions of systems thinking. In a nutshell, it is a holistic approach that considers how the different parts of a system interrelate, and how systems work within the context of other, larger systems. The UK Government definition is that “systems thinking is a way of exploring and developing effective action by looking at connected wholes rather than separate parts”. Or, in shorthand, it is taking a holistic approach.

Systems thinking approaches can be conceptual, they can be enshrined in diagrams, or they can be modelled mathematically, or all three. Systems thinking has also been referred to as a mindset rather than being a prescribed practice. Although systems thinking can apply, for example, to business systems, environmental systems, social systems, and engineering systems, more importantly as we think about today’s environmental and social challenges, it can be applied to the links between these systems.

2.2.2. Applying systems thinking to today’s challenges

Systems thinking is being used by the wider community, including researchers, to identify solutions to our environmental problems, and to seek ways to implement them. To accurately predict, adapt to and mitigate global and local environmental system responses, we need a whole-system representation of the socio-ecological connections that transcend space, time and the traditional compartmentalisation of disciplines and sectors.

So how do we, as researchers, approach this? First, we work on understanding the problem and the interconnectedness of different existing disciplinary evidence bases to identify knowledge gaps that need plugging. Second, we identify pathways to change, including developing knowledge of the near and far barriers faced in implementing solutions. Third, we build on this to facilitate action, drawing on wider input from all interlinked expertise leading to the target outcome. The outcomes can become much more bottom-up driven, supported by policy and incentive instruments.

In this way, systems thinking delivers research that integrates across all dimensions. We can bring systems thinking to bear on environmental challenges from local to global scales and considering different timescales and multiple stakeholder perspectives. Systems thinking approaches can explore complex, real-world problems to reveal unknown variables and interrelationships. It can avoid siloed and limited vision approaches to problems, frame discussions, enable working at interfaces, and structure dialogue with stakeholders and the public.

We are in a time of multiple and interacting crises - climate change, biodiversity loss, food and energy security - that affect health and wellbeing, livelihoods and society at large. We face wicked problems that seem intractable with root causes that are hard to identify. In these kinds of situations, policy often needs to be designed in the absence of perfect knowledge of how human and natural processes interact, and in a way that draws together

fragmented evidence and multiple perspectives. Systems approaches can provide structure in such cases.

2.2.3. Systems thinking resources

The UK Government provides some excellent resources on systems thinking (<https://www.gov.uk/government/publications/systems-thinking-for-civil-servants>). For example, its guidance highlights that in implementing systems thinking approaches it is useful to:

- define the problem and identify the outcome sought;
- understand and identify the boundaries through:
 - widening the horizon;
 - constraining the boundaries and complexity until they are achievable or tractable;
 - zooming out, and in;
- work across disciplines, with stakeholders - diverse teams can help.

This is elaborated in Figure 2 where the approach “should be iterative: spiralling through an exploration of purpose, interrelationships, boundaries and perspectives to gain a greater understanding of the main tensions and watch-points” (Defra 2021).

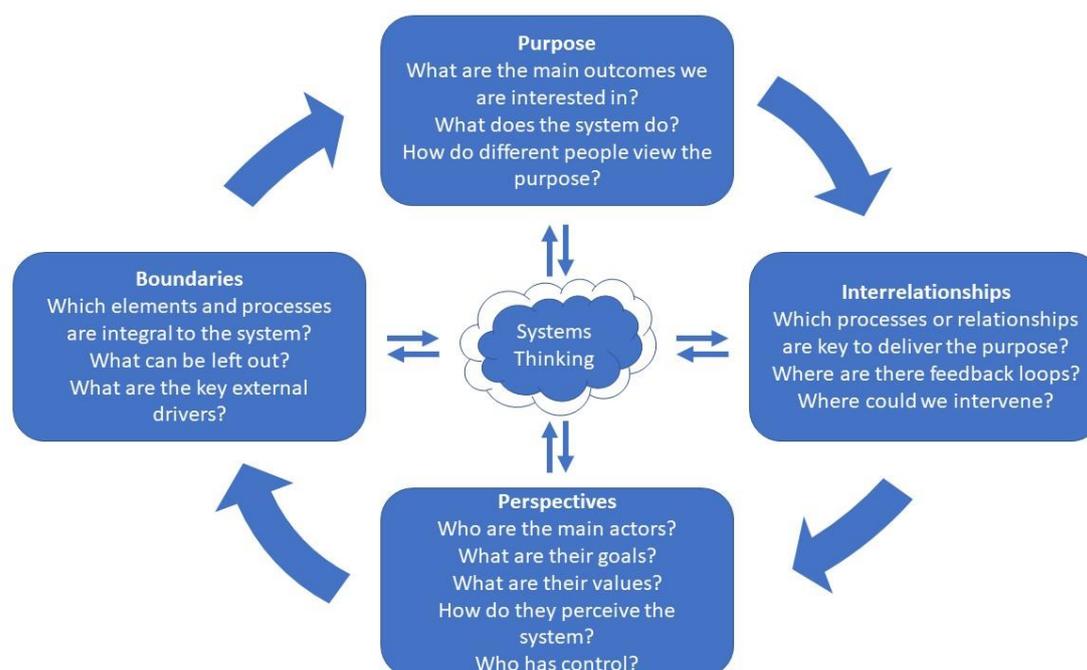


Figure 2. Systems approaches for policy making. Adapted from Defra 2021: A Primer for Integrating Systems Approaches into Defra.

2.2.4. Systems thinking for the blue economy

As we currently seek to achieve security from the sea in food, energy, transport and human health and wellbeing, the blue economy of the marine environment provides multiple opportunities for (potentially) sustainable growth in, for example, aquaculture, renewable energy (wind, tidal, solar), recreation, leisure and tourism, as well as longstanding and ongoing traditional sectors of maritime transport and fisheries.

At the same time, the ocean and its natural capital face multiple threats including biodiversity loss, climate change and related impacts, ocean acidification, land-based pollution (plastics,

nutrients, chemicals, pharmaceuticals etc), overfishing, seabed disturbance, dredge spoil disposal as well as interactions between the effects of multiple users and sectors.

The marine policy agenda is developing with firm aspirations to improve biodiversity, achieve net zero, and achieve sustainable growth and other outcomes through:

- nature-based solutions;
- nature positive;
- better managed protected areas;
- highly protected marine areas.

Yet, within a blue economy setting, we have to ask questions such as: “protected for what and for whom? Are these approaches future-proofed? Should we wait for science to reduce uncertainty? Will co-location of sectors and solutions help?”.

Here, systems thinking is needed to:

1. explore these complex, real-world problems to reveal unknown variables and interrelationships;
2. avoid siloed and limited vision approaches to problems;
3. work at all spatial and temporal scales and with multiple stakeholders.

2.3. Interdisciplinarity in policy-oriented research – the Sustainable Management of UK Marine Resources (SMMR) programme, by Professor David M. Paterson, University of St Andrews

2.3.1. SMMR background

We deal with a lot of acronyms, and I'll immediately apologise for that but hopefully explain the important ones along the way. Firstly, the Sustainable Management of UK Marine Resources (SMMR) programme was funded by UK Research and Innovation (UKRI) under its Strategic Priorities Fund (SPF), managed by the Natural Environment Research Council (NERC) in cooperation with the Economic and Social Research Council (ESRC). This joint support from different branches of the UKRI already gives a clue to the interdisciplinary nature of the programme. The SPF programme specifically targets gaps in the UKRI research portfolio with a specific emphasis on project delivery and impact.

2.3.2. The SMMR ‘Champions’ role

At the beginning of the SMMR programme, two ‘Champions’ were appointed (David Paterson and Mark James) who helped in the early development of the programme. The most important innovation was to engage widely with the relevant devolved government departments, and with organisations with responsibility for the marine environment. The Champions also provided the opportunity for researchers to speak directly with representatives of these organisations to help target projects towards real-world outcomes. This was done prior to the submission of full projects to emphasise the importance of stakeholder engagement. A further innovation was that members of the stakeholder community acted as observers during project selection, helping to advise the assessors on those projects that seemed to have the greatest potential to deliver outcomes. Six projects were finally selected (Figure 3) through this process – for example, Resow UK which is looking at the restoration of seagrass for ocean wealth - and the Champions continue to facilitate conversations between project steering groups and stakeholder groups.

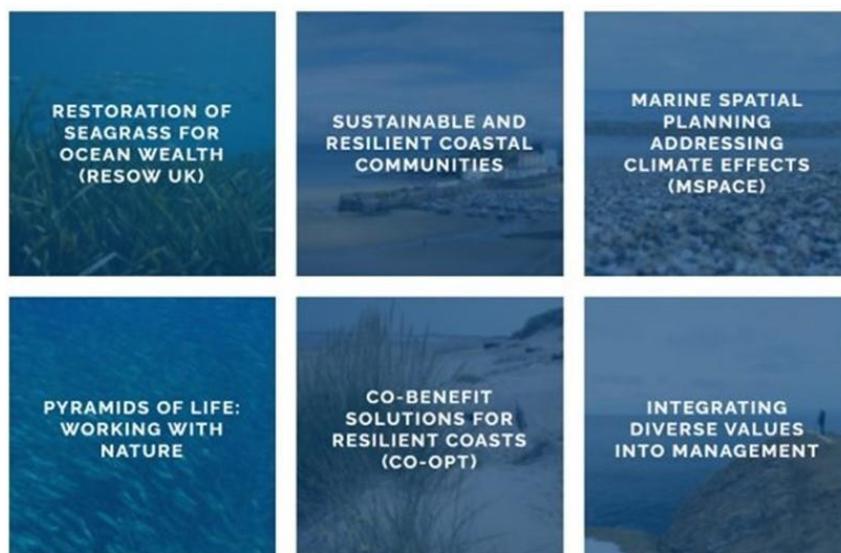


Figure 3. The selected SMMR projects. Further details from <https://www.smmr.org.uk/funded-projects/>

2.3.3. SMMR delivery

The current environmental challenges of climate change, pollution and food security are placing increasing pressures on coastal systems. However, management of these systems is complex because the goods and services delivered are utilised by many different sectors of society, each with a different view of the outcomes they require. This means that adoption of a systems approach, supported by multidisciplinary effort, is essential to produce balanced management. The objectives of the SMMR programme are to bring relevant experts together, targeting the challenges outlined above, and working closely with the stakeholders and regulators that produce the strategies required to maintain productive and resilient systems into the future. This is no easy task, so the SPF programme moves the criteria for success towards the delivery of solutions rather than just scientific excellence. An additional innovation within the SMMR programme was to provide a framework for the development of a wider network of interested parties ([SMMR-Net](#)), beyond the funded projects, to support best practice in the dissemination of information, innovative ideas and solutions. The SMMR programme and SMMR-Net has a strong emphasis on interdisciplinarity and the involvement of social sciences and the arts, since all aspects of society have a contribution to make in the understanding, dissemination and implementation of management strategies.

To facilitate wider cooperation among the UK marine community the ‘[Ocean Partnerships](#)’ initiative (Figure 4) was created to foster the SMMR-Net community. Anyone with an interest can join to network and meet others also involved with the marine environment.



Figure 4. The Ocean Partnership interactive networking initiative. More information at <https://www.smmr.org.uk/ocean-partnerships-a-new-networking-opportunity/>

2.3.4. Conclusion

The SMMR programme is innovative in several ways as outlined above, but an important additional twist is that some funding within the programme has been retained to help projects work with key stakeholders to fully implement project outputs. Often research programmes fail to deliver their full potential because support which would help fully exploit the work carried out is not available. The final assessment of the SMMR programme will be a few years into the future but this innovative approach with a focus on delivery perhaps offers an improved chance of success.

Find out more about the SMMR programme at <https://www.smmr.org.uk/> or contact us at smmruk@st-andrews.ac.uk. Join us on twitter @SMMR_UK or at our [annual conference](#) in Bristol.

2.4. Transferring lessons from Marine Pioneer to the blue economy, by Dr Aisling Lannin, Marine Management Organisation

The Marine Pioneer was part of a Defra programme to test delivery of the 25 Year Environment Plan's ambition to restore nature. It used a multi-disciplinary collaborative approach, based on real-world practice. The project was set up in two coastal and marine locations - the Suffolk Coast and the North Devon Marine Area – with four areas of focus: 1) testing the natural capital approach; 2) demonstrating a joined-up, integrated approach to planning and delivery; 3) scaling up innovative finance and funding opportunities; and 4) identifying best practice and sharing lessons. It ran from March 2017 to March 2020. There were three other Defra Pioneer programmes, covering Landscape, Urban and Catchment.

A number of lessons seem transferable from the Marine Pioneer to the achievement of a sustainable blue economy.

1. **Have a clear, simple vision of what a sustainable blue economy is** - this should be shared by most people, so everyone knows what they are working toward. Provide details through co-developed descriptions and infographics. We found that much more delivery can be achieved across a mass of people working to the same vision, no matter their organisation or occupation.
2. **Pay attention to and ensure good governance for decision making in a sustainable blue economy** – this requires investment and commitment by responsible institutions and collective expectations of standards and principles including fairness, representativeness, subsidiarity, openness, and participatory deliberation. We found that governance is disconnected and neglected, but where it is invested in and prioritised at multiple scales and entry levels then positive action happens for nature and people.
3. **Test new approaches in real-world situations** – there needs to be a culture of testing and trialling consistently that is embedded in the everyday, especially in decision-making organisations. We found that testing and applying approaches and ideas currently takes too long, when their contributions to reversing biodiversity, climate and social decline are needed now.
4. **Be clear and open about decision-making processes and methods** – principles and standards for approaches and applications should be agreed openly so they are trusted and accessible, and also flexible and adaptable so that innovation can easily be incorporated. We found that systems are rigid and mainly opaque to most people,

and this creates distrust and unease, as well as a lack of compliance and nature stewardship.

5. **Plan how to invest finance and resource in the changes** – investment should be made based on the principle that significant initial investment is needed to get long-term value. We found that creating a regenerative social and economic system around nature restoration was critical to making the changes needed to reverse the biodiversity, climate and social crises.
6. **Gain trust for institutions** – the importance of this should not be underestimated because it is so difficult to change people’s behaviour and motivations, and therefore the system, without gaining respect and confidence in how the change is being agreed and delivered. We found that communities who could contribute significantly to restoring nature and a balanced climate had low trust in institutions, which acted as a barrier to achieving restoration of nature and resilience in coastal communities.
7. **Use evaluation and feedback for learning and accountability** – the value of learning while doing and feeding that back into a system so it can be adjusted for the better, has been well documented. However, the use of routine evaluation to learn and assess impact is low. We found that adopting the recommendation to continually evaluate the development of policy, implementation of processes and impact of activities could increase the benefits and value of efforts to restore nature, especially if the learnings are shared.

In summary, it’s all about people who are empowered, included and interacted with in a transparent way. This begins to address the scale of the action that needs to be taken to achieve a sustainable blue economy at pace, before it is far too late. We need collaborative partnership on a large scale to implement and put into practice sustainable blue economy solutions. Supporting and facilitating knowledge exchange should be a priority in order to achieve sustainability fast.

The full set of recommendations from the Marine Pioneer are available at https://zenodo.org/communities/marine_pioneer_sharing/?page=1&size=20

2.5. Sustainable blue finance, public-private investment, and the transition to a blue economy, by Torsten Thiele, Ocean Global Trust

2.5.1. The role of blue finance

Finance plays a critical role in the transition to a sustainable blue economy. The emerging blue finance narrative focusses on opportunities to address climate and biodiversity risks and adaptation challenges through investment into nature-based solutions and blue natural capital. Traditional marine sectors, as well as land-based activities, have to be transitioned towards ocean sustainability, creating new opportunities, markets and pathways in emerging sectors (such as bio-products, ocean data and restoration). Connected sectors (such as technology, retail, fashion, health and well-being, infrastructure and finance) also have to be engaged effectively in this effort.

2.5.2. Approaches and principles

The *Sustainable Blue Economy Finance Principles* (UNEP-FI 2018) - now hosted by UNEP-FI - and the *IFC Guidelines for Blue Finance* both provide finance institutions with guidance. In a similar vein, the work of the Ocean Panel on “a transformative set of recommendations and actions to advance a sustainable ocean economy”, with a commitment to sustainably manage 100% of the ocean area under national jurisdiction, guided by Sustainable Ocean

Plans, by 2025, provides nations with guidance. This requires active ocean governance based on ecosystem-based management mandates and marine spatial planning, including for the High Seas (Thiele & Gerber 2017) through the proposed biodiversity treaty.

2.5.3. Examples of sectoral transformation

The types of examples of sectoral transformation that require significant blue finance support include: de-risking shipping through investment into zero-emission technologies; efficient design; ballast water management; green ports integrating nature-based solutions such as wetlands; clean onshore power; and digital technology and logistics. Integrated blue economy approaches - such as moving from traditional tourism to the transformation of coasts into thriving areas for nature and people, promoting blue well-being, ecosystem health and opportunities for communities - describe robust blue economy pathways that can access public-private investment structures, including blended finance mechanisms. There is already significant investor interest in areas such as marine renewables and in the blue bio-economy as a source of pharmaceuticals, food and energy from the sea.

2.5.4. Goals for blue finance

A critical focus of blue finance has to be on efforts to reduce stressors on the marine environment, helping to conserve marine ecosystems and facilitating biodiversity recovery and restoring blue natural capital with an ecosystem-based approach (Laffoley *et al.* 2020). This requires investing in ocean knowledge and technology, clean energy, water solutions and coastal resilience and ecosystem restoration. Innovative finance mechanisms and existing development finance institutions (Finance in Common 2020) can be activated to identify pathways to address the remaining blue finance funding gap. Effective impact assessment can help to facilitate ocean investment (Sumaila *et al.* 2020). The benefits of protecting the planet's natural capital can be quantified and far exceed the cost.

2.5.5. Pathways

There is significant global biodiversity funding (OECD 2020), yet marine biodiversity finance remains insufficient (Deutz *et al.* 2020) to deliver adequate, effective and lasting protection and management. Integrating the ocean into the global climate finance architecture (LSE Global Policy Lab) and directing finance flows and funding allocations into building knowledge (UNEP 2021) and institutional capacity, allows investing to address ocean risk (ORRAA) and helps to build businesses that use ocean resources sustainably and responsibly (Claudet *et al.* 2020).

2.5.6. Some takeaway messages

- The sustainable blue economy is an important component of a just transition to a net-zero and nature-positive economy but requires adequate finance.
- Blue finance success relies on public-private partnerships and blended finance solutions to de-risk investments, with robust metrics and monitoring and an enabling regulatory framework.
- Nature-based solutions, including blue carbon, blue natural capital and blue infrastructure approaches (Thiele *et al.* 2020), based on ocean economics and ocean accounts, can help to engage private sector partners, local communities and civil society, and offer opportunities to address risks and support resilience.

3. Contributor essays: Putting blue economy approaches into practice

3.1. Implementing the Scottish blue economy vision, by Dr Sally Rouse, Marine Scotland

In November 2022, the Scottish Government published its report on *Delivering the Blue Economy Vision* in line with the Programme for Government commitment. The report summarises the work led by the Cabinet Secretary for Rural Affairs and Islands over summer 2022, following the launch of the Blue Economy Vision and outcomes. This includes a review of the current status of Scotland's blue economy against each of six outcomes, a stocktake of how current and planned government activity is supporting delivery of the vision, and identification of the types of tools, levers and interventions that can enable progress. Additionally, the report details the results from recent engagements on the blue economy and the Scottish Government's plans for the next phase of activity.

3.1.1. Engaging on the blue economy

The first round of stakeholder engagements on the blue economy took place over summer 2022. The engagements included roundtable events with public agencies, virtual information sessions, a stakeholder survey and consultation on blue economy data sources. Feedback from the engagements was used to understand priorities for, and perceptions of, Scotland's blue economy, and to define a pathway for subsequent phases of our blue economy approach, including the format for future engagements.

3.1.2. Current status and activity underway

The status review drew together a range of existing data across the 'four capitals' (human, social, economic and natural assets) recognised in Scotland's National Strategy for Economic Transformation. This was used to illustrate 'where we are now' based on the available evidence. The assessment of how existing actions and commitments across the government and wider public sector landscape contribute towards the blue economy outcomes, and the synergies between them, allows for identification of areas already targeted by policy initiatives and where we have gaps. Figure 5 provides a high-level overview of key example activities against each outcome. Reviewing the status of the blue economy and understanding how current and planned activity aligns with the blue economy, is an important step in the process to identify where new or different actions are needed to transform our approach to marine management.



Figure 5. Example activities contributing to Scotland's blue economy outcomes (©Scottish Government - public sector information licensed under the Open Government Licence v3.0)

3.1.3. Enablers and next steps

The development of Scotland's blue economy from the current status towards the six outcomes will require a suite of different levers, tools and interventions. Collectively, these levers, tools and interventions can be considered as 'enablers' for the blue economy. A comprehensive list of enablers that could be used to deliver Scotland's blue economy vision were identified from stakeholder feedback and a review of other international blue economy approaches. The *Delivering the Blue Economy Vision* report sets out the identified blue economy enablers and their ownership across the public sector, private industries, citizens, and other organisations. Examples of blue economy enablers identified in the report include natural capital approaches to decision making, infrastructure development, use of data and digitalisation, and skills education.

Based on the status review and stakeholder feedback, and considering the enablers, next steps are identified within the *Delivering the Blue Economy Vision* report. Critically, to achieve shared stewardship of our seas in Scotland, thinking about the blue economy must become an integral part of all policy development, delivery and decision making, throughout government and beyond. Seven elements are set out as the immediate focus of the Scottish Government's work over the next 12 months to aid in the mainstreaming of a successful blue

economy approach: 1) mainstreaming mechanisms; 2) engagement; 3) pilot projects; 4) furthering the evidence base; 5) funding and finance; 6) monitoring and evaluation; and 7) governance.

Under the 'mainstreaming mechanisms' element, guidelines and tools will be developed for work streams to use, so that policy and decision making across the Marine Scotland Directorate, and then more widely, has clear alignment with the blue economy agenda. Policy making through a blue economy lens is already happening within the Marine Scotland Directorate. For example, the Blue Economy Vision is at the heart of Marine Fund Scotland, through which we have provided £14 million in grant funding to a range of sectors which support Scotland's net zero commitments. This protects and creates jobs in Scotland's coastal communities and supports local supply chains and industries to adapt and invest for the future. As we extend our approach wider, to get it right, we will need to develop, test and learn, working with others, including enterprise agencies, delivery partners and sectors, including business. To achieve shared stewardship, we must ensure those operating in this space take an approach where individual policies and decisions minimise or reduce impacts on, or enhance, marine natural capital; wider community benefits are realised and our heritage is protected; and productivity, resilience equality and innovation in marine sectors and supply chains is supported.

3.1.4. Takeaway messages

- The Blue Economy Vision is a multi-decadal strategic document. Identifying and developing the right enablers, the tools, interventions levers and actions will take time in some cases, as we seek to break new ground, but there will be priority actions that we can look to front load.
- It is vital for all areas of Scotland's society to contribute towards the Blue Economy Vision if we are to drive forward the transformative changes needed to unlock the true economic potential of Scotland's seas, promote wellbeing and tackle the twin nature and climate crises through a just transition.

3.2. Accelerating the transition to a sustainable blue economy: UNEP's Sustainable Blue Economy Transition Framework, by Dr Lucy Greenhill, Howell Marine Consulting

The transition towards a sustainable blue economy is a multifaceted process which aims to embed ocean sustainability throughout decision making and ensure integration and balancing of diverse and increasingly competing natural, social and economic interests. In practice, this is challenging because traditional approaches to ocean governance are often fragmented, with policy areas and sectors managed separately and in different ways. New approaches are needed to enable policy coherence, where different parts of government - and society more broadly - work together to identify common goals and ensure that one area of development does not undermine that of another. This requires understanding interdependencies between marine and cross-cutting policy themes and developing new ways of working which promote policy coherence throughout decision-making systems.

3.2.1. The UNEP Sustainable Blue Economy Transition Framework

To support countries in this transition, the United Nations Environment Programme (UNEP), with Howell Marine Consulting and the University of Portsmouth, are developing a Sustainable Blue Economy Transition Framework (SBE-TF). This prototype framework provides countries with guidance for developing a strategic process to collectively envision and formulate a transition process which is practical and achievable based on a nation's unique set of needs. It defines three phases of the transition to guide the process (Figure 6).

Extensive activity is already underway in most countries, and the SBE-TF provides a way to conceptualise the change needed throughout the policy and management cycle and to develop an integrated approach.

At the core of the Transition Framework exist five guiding principles: 1) healthy ecosystems; 2) equity and inclusivity; 3) climate stability and resilience; 4) sustainable consumption and production; and 5) circular processes. These principles are the guiding thread that runs throughout the transition process, connecting and steering any decision or action a country takes.

The phases of the SBE-TF are:

- **Phase 1** - Understanding the system. This phase requires gathering an understanding of social, environmental and economic baselines, as well as institutional arrangements and capacity, in order to understand the system and how it is functioning.
- **Phase 2** - Enhancing the system. Taking the understanding from Phase 1, Phase 2 centres on developing a shared direction of travel, based around a clear vision of what a country wants in relation to a blue economy, and articulating this as an integrated policy framework which defines the action needed to steer change throughout decision making, along with appropriate and accountable governance mechanisms.
- **Phase 3** - Delivering change. This long-term phase represents the practical implementation of integrated sustainable blue economy policy on the ground through enhanced governance and integrated marine management, including important tools such as marine spatial planning. It also includes monitoring and evaluation to inform an understanding of progress towards sustainable blue economy outcomes and to inform adaptive approaches.

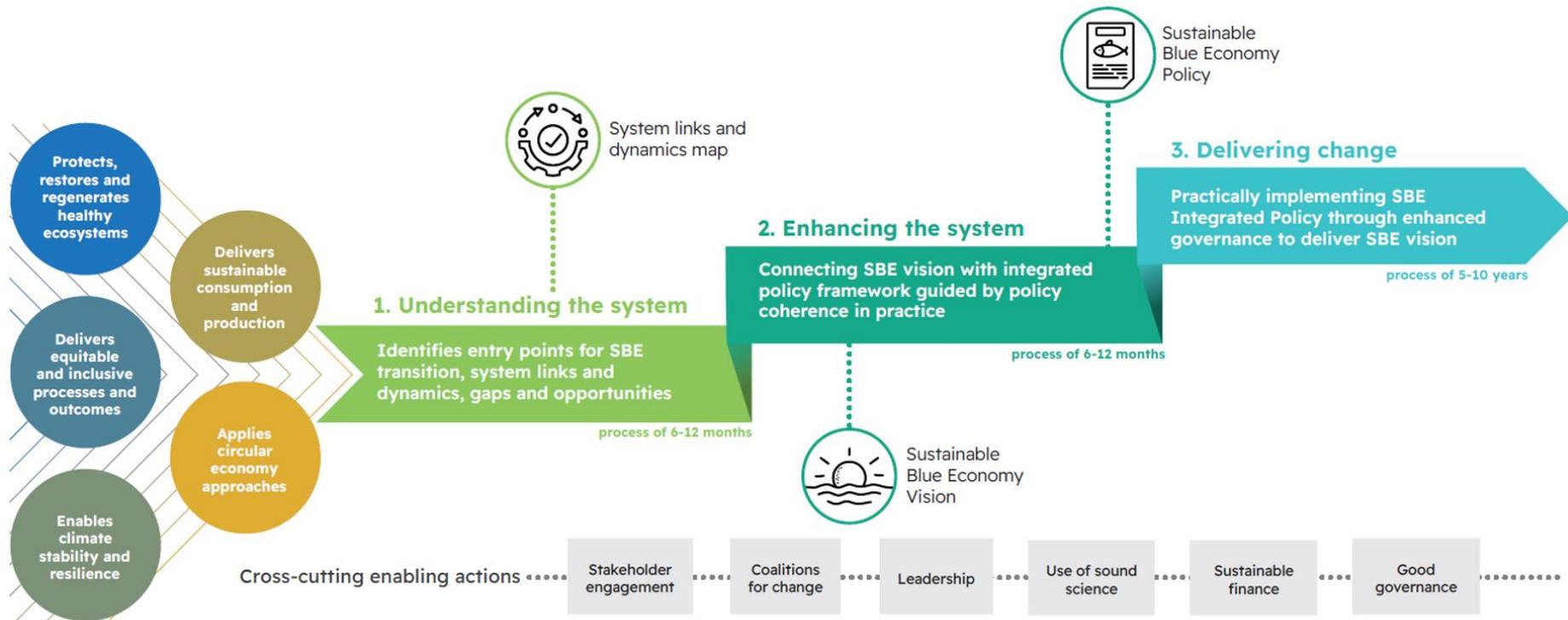


Figure 6. The UNEP Sustainable Blue Economy (SBE) Transition Framework.

All phases and activity in the framework must be underpinned by cross-cutting 'enabling conditions' which are fundamental to the transition, as summarised in Table 3.

Table 3. Cross-cutting enabling conditions of the UNEP SBE-TF.

Condition	Activity
Stakeholder engagement	Active stakeholder engagement throughout the transition process is needed to ensure that decisions are based on best available knowledge and are inclusive, fair and equitable.
Leadership	Strong political will and government leadership is essential to maintain momentum and to lead change in the governance system.
Coalitions for change	Coalitions of multi-actor stakeholder groups operating across the governance system can also catalyse positive change by sharing knowledge and capacity and seizing opportunities.
Use of sound science	Decisions must be based on the best available evidence with scientific effort steered to address gaps in knowledge and support innovation.
Sustainable finance	Ensuring sustained revenue streams is essential to support the transition, including innovative approaches to financing and various public / private partnership models.
Good governance	The principles of good governance are essential throughout the process, including accountability, transparency, equity and inclusiveness.

The SBE-TF provides a guiding tool for understanding the transition journey to move away from 'business as usual' and to make meaningful progress towards a sustainable blue economy. While still in development, the framework can support understanding the key needs of a sustainable blue economy and an integrated approach to ensuring progress, shaped by a nation's specific context. The prototype SBE-TF will be further refined by UNEP and project partners in 2023.

3.2.2. Key messages

- The transition to a sustainable blue economy is a complex and multi-faceted process which requires integrated approaches and new ways of thinking.
- Policy coherence is central to a sustainable blue economy, where synergies and trade-offs between different policy areas are understood and managed, to maximise opportunities where possible and reduce negative consequences for the environment and society.
- The UNEP Sustainable Blue Economy Transition Framework provides practical guidance on how to approach the transition in individual countries, in a co-ordinated way.

3.3. Putting the blue economy transition into practice: trialling Rapid Readiness Assessment in the Caribbean, by Dr Lucy Greenhill, Howell Marine Consulting

To support nations in taking forward UNEP's Sustainable Blue Economy Transition Framework (SBE-TF, described in 3.2), a 'Rapid Readiness Assessment' (RRA) has been developed. The RRA approach was piloted in [Trinidad and Tobago](#), and [Antigua and Barbuda](#), in 2022, supported by the UNEP and the Commonwealth Secretariat, through their

[Commonwealth Blue Charter](#) programme. Reflecting the activities of Phase 1 of the SBE-TF, which focusses on understanding the system and key enabling conditions for the transition, RRA provides an opportunity to rapidly gather baseline intelligence on the status of ocean-related policy, governance and institutional structures in a country, and their capability and capacity to support change.

Through information gathering and dialogue at the national level, the RRA process identifies the current status of the blue economy and key actions to drive the transition towards it, based upon a country's specific circumstances. RRA is not intended as a comprehensive analysis (which may also be required) and instead focusses on fast-paced situational analysis to support immediate practical action.

Working with national governments and stakeholders, the objectives of the RRA pilots were to:

- collectively identify and understand the necessary first steps to improve their sustainable blue economy;
- assess their readiness for taking forward the Transition Framework approach; and
- identify initial priority enabling actions and resources needed.

Information was gathered through interviews, surveys and in-country workshops with stakeholders (primarily from across government with some non-governmental bodies such as environmental organisations) in order to understand current progress and the status of key enabling conditions based on the SBE-TF, including:

- leadership;
- institutional infrastructure and culture;
- laws and policies;
- planning and management;
- sustainable finance;
- stakeholder engagement and coalitions;
- data and monitoring.

For each enabling condition, an assessment was made in relation to the readiness criteria shown in Figure 7. This proved a useful basis for discussions with stakeholders on areas of progress and where there are areas for action.

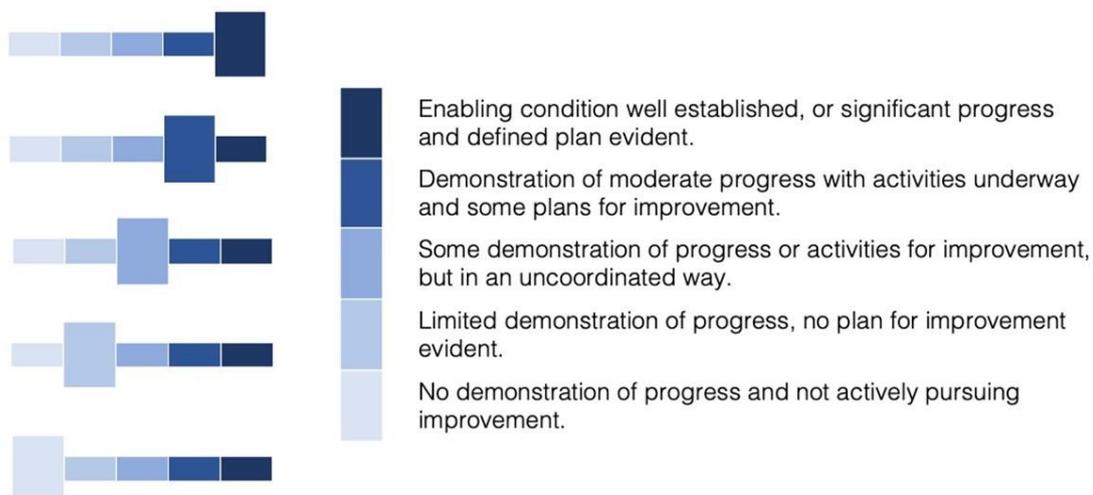


Figure 7. Readiness criteria for the RRA.

In [Antigua and Barbuda](#), the RRA process brought to light several key issues and opportunities, including the following:

- the draft National Ocean Policy (NOP) demonstrates progress towards an integrated policy framework as well as political support for the transition to a sustainable blue economy. However, this remains in draft and must be formally adopted to ensure key principles are upheld in decision making;
- cross-government coordination is supported by a National Ocean Governance Committee (NOGC) but overlaps with a newly established Department of the Blue Economy (DoBE), which is problematic. Refining mandates to be mutually supportive was indicated as an achievable and impactful next step;
- while progress has been made, further dialogue and engagement of stakeholders - inside and outside government - is needed to develop a shared understanding of what a sustainable blue economy is, what it means for Antigua and Barbuda, and to enhance collaboration;
- as a twin island nation, representation of the smaller Barbuda could be improved, including learning from experience on Barbuda of 'bottom-up' and community-led management, which can lead to better equity in decision making.

In [Trinidad and Tobago](#), the RRA identified that:

- with a significant oil and gas sector, decarbonisation and the incremental phasing out of fossil fuels could be a central component of the transition to a sustainable blue economy. Engaging this sector could support economic diversification in the long term, including the development of offshore renewable energy generation, while government revenues from oil and gas could be directed to funding initiatives which would accelerate progress to a sustainable blue economy;
- while institutional capacity and resources are relatively high, there remains low political buy-in and commitment to a sustainable blue economy to channel resources effectively. Appointing a lead ministry and developing a cross-cutting and integrated sustainable blue economy policy framework is needed;
- the adoption of important legislation is being held up, including Integrated Coastal Zone Management (ICZM), the Fisheries Bill and the National Maritime Policy. Creating a package of legislation and adding consistent preamble relevant to the sustainable blue economy would provide it with a critical co-ordinated legislative basis;
- better integration of social outcomes might be secured by reviewing existing and draft policy to identify opportunities to enhance social sustainability, such as job creation and poverty alleviation.

Piloting the RRA in Antigua and Barbuda and in Trinidad and Tobago provided opportunity to explore and understand how a transition to a sustainable blue economy may be supported in different country contexts. Participants were positive about the RRA process as it led to increased understanding of the sustainable blue economy concept, the opportunities and benefits it presents, and how their role or work area relates to its delivery. Through well-facilitated dialogue, RRA provides a rapid yet valuable exercise for supporting stakeholders in a particular country to develop a shared direction of travel, draw connections between different activities and articulate practical next steps. The RRA methodology, and the wider UNEP SBE-TF, will be revised following the experience in these pilots to ensure a practical guide which can support the sustainable blue economy transition in any national context.

3.3.1. Key messages

- Rapid Readiness Assessment (RRA) is a valuable tool for promoting practical action through working with stakeholders to develop a shared understanding of the transition and immediate next steps.
- The overall transition to a sustainable blue economy is complex and can be daunting; RRA provides a relatively quick exercise which supports stakeholder engagement and develops momentum by focussing on key sticking points, opportunities, and immediate next steps.
- Further trialling of RRA in different countries and contexts would be informative to support application and refinement of the approach.

3.4. From blue economy implementation to valuation and accounting, by Professor Pierre Failer, University of Portsmouth

3.4.1. Blue economy implementation perspectives

More and more coastal countries are betting on the blue economy to promote the sustainable development of their coastline. It is vital for the island nations of the Pacific, the Caribbean and Africa because of their strong interdependence with the ocean. In the context of the global COVID-19 pandemic, island economies were particularly impacted because of the shutdown of the tourism sector that, for instance, accounts for more than half of the Bahamas' and other Caribbean islands' gross domestic product. In that regard, blue economy policies are an important aspect of islands' and coastal states' recovery by guiding government and stakeholder efforts to revitalise the economy in a resilient and sustainable manner while also enhancing each country's natural and social heritage.

The development of the marine area under national jurisdiction also has a strategic importance. Bangladesh, for example, initiated the process of developing a blue policy after the expansion of its exclusive economic zone following two decisions of the International Tribunal of Arbitration on maritime boundaries with Myanmar on one side, and India on the other. Since 2016, the EU has supported countries in defining blue economy policies and actions, and in implementing coordination mechanisms. Maritime space and what it contains thus becomes an opportunity.

However, the blue economy remains at the conceptual stage for most countries, including island nations, because they have not developed the institutional framework and deployed the necessary implementation tools. Some countries such as the Seychelles, Barbados, Cabo Verde, Bangladesh and Kenya, with European support, are providing examples through setting up a coordination mechanism for the implementation of the blue economy. However, despite these efforts, the blue economy remains restricted to the development of certain sectors such as fishing, coastal tourism or the exploitation of minerals from the seabed. A holistic approach is needed to face the challenges of climate change, plastic pollution, etc., for which transformational change is required. The human, technical and financial resources that must be deployed to meet such challenges go beyond the sectoral scale.

As such, the implementation of blue economy strategy and policies requires the setting up of an effective institutional arrangement – that can be described as blue governance – to manage the interactions and decision making among the actors involved in this collective problem. More precisely, it refers to the coordination, planning (including maritime spatial planning), monitoring (including blue accounting) and blue international standards (referring to the circular economy) of blue economy-related activities. A governance framework is thus

required to build a multi-scale organisational scheme and foster long-term collaboration among national institutions and with regional ones.

3.4.2. The need for blue accounting

Accounting for blue economy components has not yet been undertaken in African countries, or performed according to standards which allow for consistent information across the countries. Overall, a critical barrier to presenting a comprehensive view of the blue economy (at the social, economic and ecological level) is the lack of comparable data which must first be gathered from different sources. Creating an appropriate national accounting framework which embraces social, economic and ecological components should facilitate recording annual changes to identify the contributions of the blue economy.

Ecological components of the blue economy are also inadequately incorporated. Critical ecosystem services, like those provided by coastal areas, are improperly and seldom valued. The 2015 Paris Agreement requires each country to prepare and communicate their post-2020 climate actions, known as their Nationally Determined Contributions (NDCs). The implementation of *a process to track* NDCs to facilitate 'green' and 'blue' accounting will benefit decision and policymakers by becoming the cornerstone for evidence-based actions, like those related to climate change.

The need for accounting schemes specific to the blue economy has been identified as critical for achieving blue economy objectives. The expansion of blue economy accounting was based on the unification of blue satellite accounts (Box 2) and blue ecosystem accounts (such as for blue carbon – see Box 3) which have been inscribed in the strategy and working plans at various scales:

- continental ([Africa Blue Economy Strategy](#) (AU-IBAR 2019));
- regional (Indian Ocean Commission (IOC) and Intergovernmental Agency for Development Strategies (IGAD) (first one completed, with a second nearing completion); and
- country (Seychelles, Mauritius, Kenya, Barbados, the Bahamas and Jamaica).

Box 2. Satellite accounts.

“A satellite account provides a framework linked to the central (national or regional) accounts, allowing attention to be focussed on a certain field or aspect of economic and social life in the context of national accounts; common examples are satellite accounts for the environment, or tourism, or unpaid household work. Satellite accounts are one way in which the System of National Accounts may be adapted to meet differing circumstances and needs. They are closely linked to the main system but are not bound to employ the same concepts or restrict themselves to data expressed in monetary terms. Satellite accounts are intended for special purposes such as monitoring the community's health or the state of the environment. They may also be used to explore new methodologies and to work out new accounting procedures that, when fully developed and accepted, might become absorbed into the main system over time. Satellite accounts can meet specific data needs by providing more detail, by rearranging concepts from the central framework or by providing supplementary information. They can range from simple tables to an extended set of accounts in special areas like, for example, environment or education.”

Box 3. Blue carbon accounting.

Blue carbon has only been part of our vocabulary since 2009 (UNEP 2009). The term emerges in the movement of the implementation of the blue economy in the same way as those of blue growth, blue biotechnologies and blue bonds for instance. It refers to the carbon dioxide (CO₂) absorbed and stored by marine and coastal ecosystems. In open waters, the phytoplankton plays an important role for the sequestration of carbon, while the bottom of the sea provides a key function in storing carbon resulting from the decomposition of plants and animals. The same phenomenon exists along the coast where the CO₂ contributes to the growth of plants to produce biomass through photosynthesis. Seagrass meadows, tidal marshes and mangroves are the three major blue carbon ecosystems by their sequestration and storage.

In 2015, only mangroves were recorded in the intended national determined contribution (INDC) for the preparation of the Paris Agreement. Today, the tendency is to expand the list to other blue carbon ecosystems as their importance for climate change mitigation is increasingly revealed in coastal countries. Thus, Cabo Verde has recently announced that it will include seagrasses in its NDC. In Mauritania, the seagrasses ecosystem of the large marine protected area of the National Park of the Banc d'Arguin is contributing 20% to the achievement of the NDC of the country. This is estimated at US\$9 billion with an annual operating cost of about US\$1.5 million: a very high return on investment!

Despite the significant contribution of coastal ecosystems to the climate change mitigation process, no country has yet put in place a formal blue carbon assessment and accounting mechanism. The assessment is carried out on an ad hoc basis and generally concerns marine protected areas to highlight their importance, no longer in terms of maintaining biodiversity, but in terms of combating the effects of climate change, which is much more likely to attract funding.

In 2020, UNECA launched an initiative to report on the contribution of blue ecosystems to the development of the blue economy of African countries (UNECA 2020). The evaluation tool that was developed, adaptable to all African, Caribbean and Pacific nations as well as other countries, makes it possible to account for all the services produced by blue ecosystems in a relatively simple and inexpensive way. More sophisticated accounting systems are under development, such as the UN System of Environmental-Economic Accounting (SEEA). This comprehensive statistical framework for ecosystem services integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment, and the stocks, and changes in stocks, of environmental assets. Using these tools, efforts should be made in the short term to obtain a baseline evaluation of the blue carbon of coastal ecosystems as well as monitoring its annual evolution based on the change of the size of ecosystem and ecological or health condition.

3.4.3. Takeaway messages

- Implementation of blue economy strategies and policies requires an effective institutional 'blue governance' arrangement for the holistic management of interactions and decision-making among the actors involved in this collective problem.
- The blue economy remains at the conceptual stage for most countries, including island nations, because they have not developed this institutional framework and deployed the necessary implementation tools.
- Evaluation toolkits are under development to help obtain a baseline of a country's blue economy and monitor progress, although limited data availability is a key challenge in measuring blue economy performance.

3.5. Case studies in sustainable finance for the ocean: blue bonds and reef insurance, by Andreas Hansen, The Nature Conservancy

3.5.1. Introducing The Nature Conservancy

The Nature Conservancy (TNC) partners with communities, businesses, governments and other stakeholders in over 75 countries and territories across the world to implement innovative solutions to tackle the climate and biodiversity crises. Founded in 1951, our mission is to “conserve the lands and water on which all life depends”. We focus on the priorities that science shows us are most urgent — and where our innovation and expertise can have the greatest impact.

3.5.2. Mobilising finance for climate and nature

To achieve that mission, mobilising sustainable finance for climate and nature action is critical. In 2020, we released a report with the Paulson Institute which identified an annual biodiversity funding gap of US\$700bn, a figure that became central to the recent Convention on Biological Diversity COP15 negotiations in Montreal (Deutz *et al.* 2020). Traditional sources of finance cannot bridge that gap alone. TNC is therefore working with partners globally to mobilise new funding streams as part of the solution.

Our 2020 report highlighted that funding for marine protection and conservation is woefully inadequate: the current global protected area network of 16% of land and 7.4% of the ocean received just US\$24.3bn annually – approximately one-third of what is needed for effective management (Waldron *et al.* 2020). Recent studies put the cost of managing marine fisheries sustainably as US\$23-47 billion per year (Mangin *et al.* 2018), and we estimate that coastal biodiversity conservation (protecting and enhancing mangroves, saltmarshes, seagrasses and other coastal ecosystems) will require annual funding of US\$27-37 billion every year (Deutz *et al.* 2020).

TNC has long-standing experience delivering innovative approaches to mobilising finance for climate and nature action. For example, in the late 1980s and early 1990s, we pioneered several traditional bilateral debt-for-nature swaps in Latin America, which freed up funding for conservation while reducing countries’ debt burdens. Since then, we have developed new models that build on the successes of the early mechanisms while improving their outcomes for debtor countries, local communities and nature.

The following case studies highlight two more recent models for mobilising finance for marine conservation: Blue Bonds and Reef Insurance.

3.5.3. Blue Bonds

The ‘Blue Bonds for Ocean Conservation’ programme was developed in 2014 to support a step-change in the scale of ambition for ocean protection. Today, we see Blue Bonds (Figure 8) as a tool that can support the ‘30 X 30’ target - to protect at least 30% of the global ocean by 2030, now embedded in the Global Biodiversity Framework - and a means to support developing countries to meet wider climate, development and debt management goals.

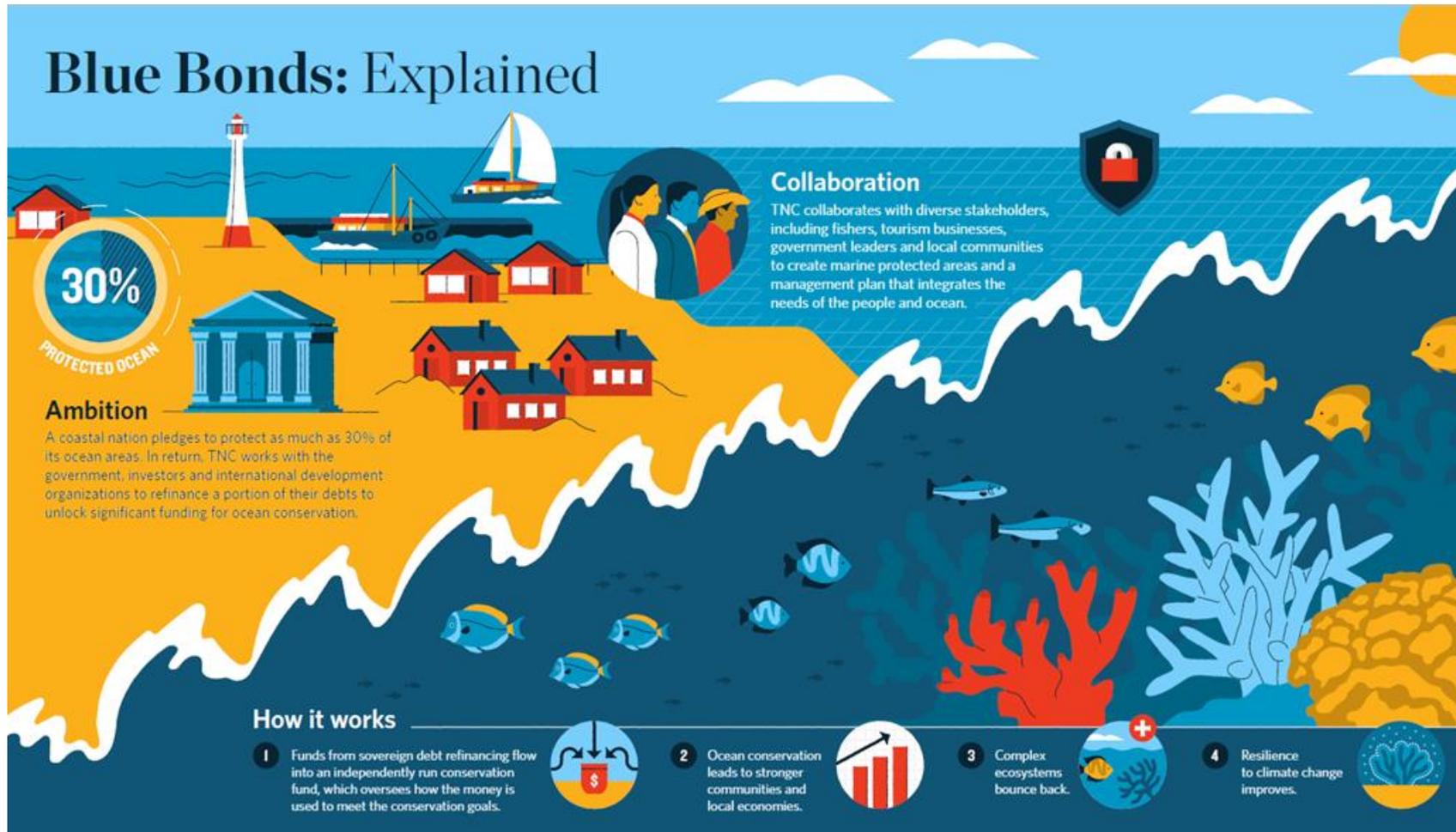


Figure 8. Blue Bonds explained.

The programme centres on partnerships between TNC and governments with high ambition for ocean conservation, including a commitment to '30 X 30'. Working with the national government and third-party financing partners, the programme refinances a portion of a country's national debt to unlock funding for marine conservation, promote sustainable development for coastal livelihoods and economies, and reduce the overall debt burden – a win-win for people, nature and climate.

Although each project varies according to the context of the partner country, there are three key pillars to Blue Bonds projects:

1. **Conservation commitments and Marine Spatial Planning** - a country commits to conducting a Marine Spatial Plan (MSP) with the ambition to protect 30% of its exclusive economic zone (or the amount that comes out of the MSP process). TNC supports the government to carry out a multi-sectoral MSP, approaching ocean use holistically to reconcile the needs of different stakeholders and uses. Inclusivity and equity are essential values, and community engagement is prioritised.
2. **Debt conversion financing** - refinancing of national debt is generally completed in one of two ways. The first sees TNC support the government to renegotiate the terms and conditions of existing debt, bringing in third parties to provide political risk insurance for the new terms. Alternatively, TNC works with the government and finance institutions to access new finance at better terms than existing debt. This finance is used to pay back existing debt, while also freeing up savings which are directed towards marine conservation. This second model relies on a guarantee issued by a third party (such as the Inter-American Development Bank) and sometimes TNC. In both cases, the refinancing of the debt burden frees up funding that is then reinvested in marine conservation through a legal agreement.
3. **Conservation Fund** - working with the government, TNC establishes a Conservation Fund or ensures an existing fund is adequately set up to work with the Blue Bonds project. This is the vehicle through which the new funding flows and is redistributed for marine conservation.

To date, we have implemented Blue Bonds with the Seychelles, Belize and Barbados (Table 4).

Table 4. TNC Blue Bond implementation.

Location	Implementation
Belize	In 2022, TNC refinanced US\$550 million of distressed external commercial debt with the support of political risk insurance provided by the US Development Finance Corporation. This reduced debt overall by US\$189 million, reduced debt service repayments and extended repayment terms. Using savings generated from the project, Belize committed to make conservation payments of US\$4.2 million per year for the next 20 years through the independent Conservation Fund to protect up to 30% of its marine area, tripling its annual conservation budget (TNC 2020a).
The Seychelles	Through a combination of US\$15.2 million of impact capital and US\$5 million in grants, TNC was able to buy-back US\$20.2 million of national debt. As part of the project, Seychelles agreed to redirect a portion of the funds saved from repayments to conserve a marine area of 1.4 million square kilometres, or 30% of its marine area, up from 0.04% at the time (TNC 2018).

Barbados	In 2022, TNC and the Government of Barbados announced a Blue Bonds project that will provide US\$50 million of funding for marine conservation in Barbados over the next 15 years. As part of the debt conversion, Barbados will commit to protect and effectively manage up to 30% of the nation's oceans. The deal represents a new transaction structure to enable a US\$150 million direct issuance by the Government of Barbados to refinance expensive pre-existing debt. This was made possible by a co-guarantee by the Inter-American Development Bank (US\$100 million) and TNC (US\$50 million) (TNC 2022b).
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Interest in Blue Bonds is growing. TNC has a pipeline of future projects with governments across the world. The UK could support scaling up this model, both by providing financial assurance to de-risk deals directly and by using its influence as a donor country to support multilateral development banks and development finance institutions to do the same. The development potential and benefits of such deals for supporting sustainable livelihoods also present a credible argument for integrating blue bond-type deals into the UK's International Climate Finance portfolio.

3.5.4. Reef Insurance

Coral reefs provide huge benefits to coastal communities, economies and ecosystems. They protect coastal areas and infrastructure from storm damage and provide rich fishing grounds and other ecosystem services. However, they are increasingly damaged by storm and extreme weather events, and over-fishing and economic activity. Reef repair and conservation work is generally underfunded, despite the cost of doing nothing often resulting much higher.

Reef insurance schemes aim to remedy this. Like traditional insurance schemes, if certain conditions are met during a storm event, an insurance pay-out is triggered that can fund restoration and repair. TNC completed the first such scheme of its type, in Quintana Roo, Mexico (Figure 9), and we have already seen the insurance delivering results. The insurance was bought on behalf of the State of Quintana Roo at a cost of US\$250,000 in 2019, following the Establishment of Trust for a Coastal Zone Management, Social Development and Security.

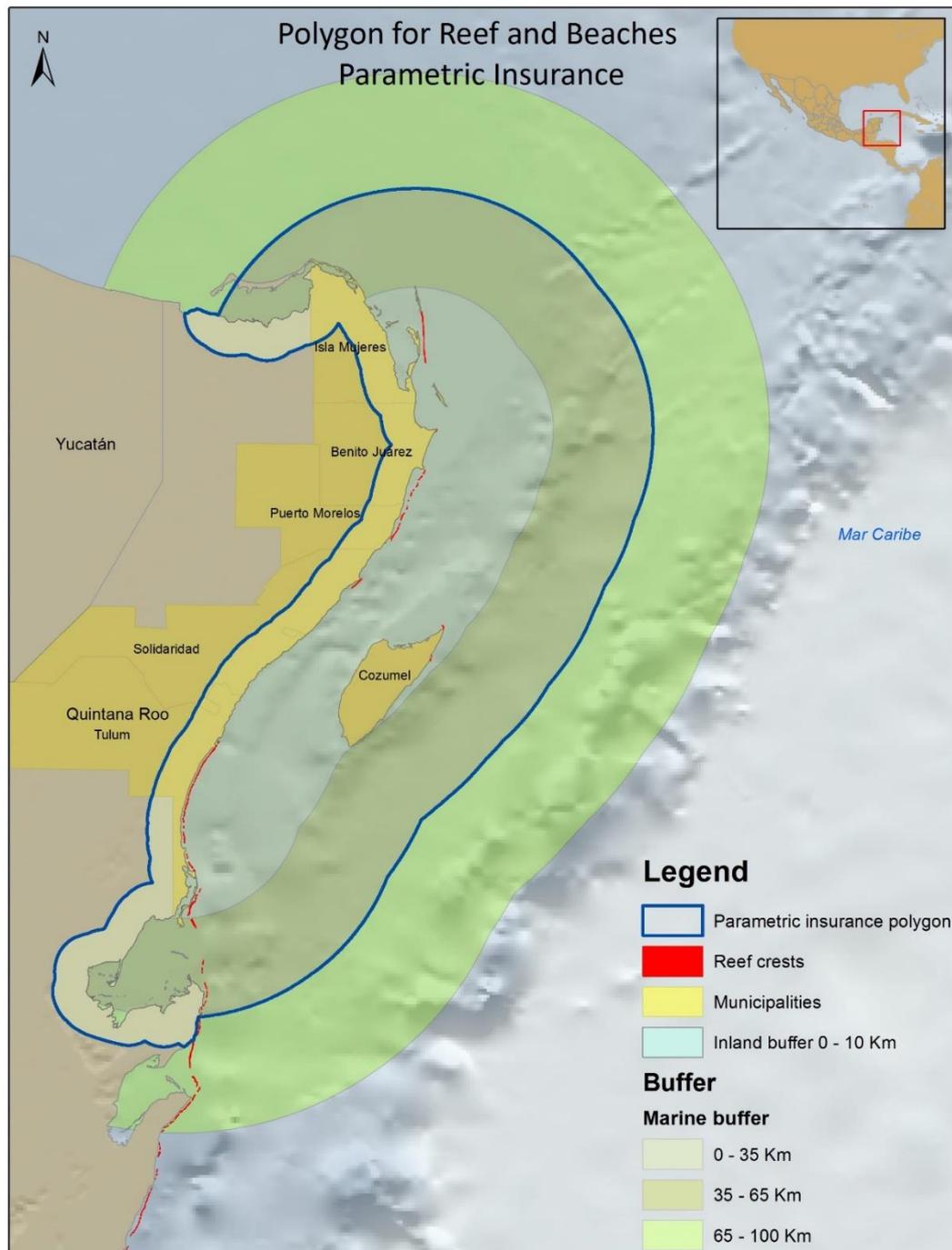


Figure 9. Map of Quintana Roo insurance area (Government of Quintana Roo *et al.* 2021).

In October 2020, Hurricane Delta met the parameters for insurance pay-out. A US\$850,000 insurance pay-out was triggered to the Quintana Roo Government. This was mobilised to deploy reef brigades to stabilise 2,152 coral colonies and re-attach 13,570 coral fragments. This first insurance pay-out and subsequent reef repair demonstrated the importance of timeliness: repairing within 90 days of the storm increased the chance of recovery significantly. Furthermore, while the insurance policy provides the necessary funding, adequate response systems and infrastructure are clearly required, for example a response brigade, response protocol, and a governance system (Government of Quintana Roo *et al.* 2021).

Such ecosystem insurance schemes could be replicated in geographies like the UK, in cases of flooding and other extreme weather events, where natural solutions can provide value protection. Insuring green infrastructure can have transferable benefits.

3.5.5. Conclusions

We know that funding for marine conservation is currently well below what is required to effectively protect marine ecosystems and deliver on commitments under the Global Biodiversity Framework. To stand a chance of meeting targets such as protecting 30% of the ocean by 2030, we must mobilise more finance from various sources. Innovative finance mechanisms such as Blue Bonds and Reef Insurance can play an important part. However, innovative finance does not work in a vacuum: adequate governance, planning and infrastructure are required to ensure finance is mobilised effectively to deliver positive outcomes for marine areas and coastal communities. We also need to effect a further change in economic systems to fully account for the potential economic risk associated with no action.

4. Determining the way forward

The principles shared by current sustainable blue economy strategies in countries around the world suggest some essential steps to achieving a successful transition to ocean sustainability for the UK:

1. Identifying an integrated vision to achieving ocean sustainability.
2. In order to achieve this vision, recognising a set of principles that align with existing UK policy frameworks and environmental targets. These principles need to support a reformative and regenerative economy, as well as contribute to building a strong governance framework.
3. Taking an evidence-based approach that focuses on the economic, social and biodiversity impacts and takes a systems approach that builds on the natural capital ecosystem assessment framework to identify the pathway to transition.
4. Mobilising financial investment into nature-based solutions and blue natural capital through public-private investment structures, including blended finance mechanisms.
5. Setting up monitoring and evaluation systems that help to deliver and measure progress and any impacts resulting from the actions taken and investments made.

Countries around the world – and indeed within the UK - are at different stages of this journey and have differing degrees of complexity and specific needs. While recognising our differences, however, there is much we can learn from each other. Thus, the final essential step for transitioning to a blue economy that we wish to highlight in this report is the invaluable role of partnerships, collaboration and sharing of good practice, as well the importance of widening the discussion and involving more stakeholders.

The workshop and this report are contributions to that process.

Moving forward, JNCC will seek to continue to use its convening power to facilitate ongoing collaboration between the countries of the UK in pursuit of our shared aim of delivering an integrated approach towards a sustainable blue economy across the UK.

We will achieve this aim through continuing to work in partnership with the country nature conservation bodies, other government bodies, academia, research organisations, business and financial partners, and NGOs. In so doing, we will complement our own expertise with that of others, and join up the discussions, so that together we can develop integrated, robust and cost-effective solutions to the challenge of ocean sustainability.

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Professor Melanie Austen is Professor of Ocean and Society at the University of Plymouth where she is also Director of its Centre for Systems Thinking: Ocean, Land and Society. She has been at the forefront of international and national marine natural capital and ecosystem services research for 20+ years with 120+ publications. She has led collaborative, interdisciplinary research in relevant projects, including on coastal communities in SE Asia (GCRF Blue Communities), economic impact from change in marine life (FP7-266445, VECTORS) and SW UK 'Natural Capital' (SWEEP). She currently leads the UKRI Centre for Doctoral Training in Sustainable Management of Marine Resources, which is training the next generation of transdisciplinary marine researchers and practitioners. She is a member of the Board of Natural England, and of the JNCC Board as one of two Natural England representatives. She was on the UK Government's Natural Capital Committee and served a three-year term as the first Chief Scientific Advisor to the UK's Marine Management Organisation; she is Chair of the Partnership of the UNESCO Biosphere Reserve in North Devon, UK.

Professor David M. Paterson – University of St Andrews

Professor David Paterson is Executive Director of The Marine Alliance for Science and Technology for Scotland (MASTS) and SMMR champion. He's also Chair of the Shetland Oil Terminal Environmental Advisory Group (SOTEAG), and of The European Research Infrastructure Consortium (EMBRIC-ERIC) General Assembly. In addition, David is principal investigator at The Scottish Universities Partnership for Environmental Research Doctoral Training Programme (SUPER DTP) at the University of St Andrews. His research interests include the ecology and dynamics of coastal systems with a strong focus on the biodiversity-ecosystem function debate.

Dr Aisling Lannin – Marine Management Organisation

Dr Aisling Lannin is the Head of Scientific Evidence and Evaluation at MMO. She has a PhD in fisheries biology and management, with extensive time working at sea and in European fisheries laboratories. She has 15 years' experience applying UK Government marine and fisheries policy using interdisciplinary science. She managed a UK Marine Protected Area (MPA) and co-wrote an ecosystem based MPA management plan hailed as a UK exemplar. She has provided scientific advice for stakeholder identification of MPAs and marine licence applications at Natural England. Aisling co-designed the MMO's scientific evidence delivery system and co-wrote the MMO Evidence Strategies. Her work in the MMO has been focussed on applying science to marine decision making in fisheries, conservation, regulation of environmental impacts from development and implementing of a marine planning system. This has required advising and steering research programmes across the UK within and outside government, as well as designing and commissioning bespoke research to fulfil scientific evidence needs for the MMO. Aisling led the Marine Pioneer programme for Defra and the MMO, a collaborative and participative exploration of applying a natural capital approach in two coastal and marine areas in England.

Professor Pierre Failler – University of Portsmouth

Professor Failler is the Director of the Centre for Blue Governance. He holds the UNESCO Chair in Ocean Governance. He has been coordinating complex research projects with

multidisciplinary teams for more than 25 years in Europe, North America, Africa, Asia, Caribbean and Pacific coastal countries in collaboration with national research institutions and universities and with a close link with policy bodies. He has recently coordinated the Blue Economy Strategy for the African Union, the Regional Action Plan for the Blue Economy of the Indian Ocean Commission, the Blue Economy Strategy of the Intergovernmental Authority for Development (IGAD) as well as the Blue Economy Strategy for Bangladesh, Seychelles, Guinea, The Bahamas, Jamaica, Madagascar, and Tanzania. He has authored and co-authored several journals and policy reports. He is also a scientific evaluator for several research councils in UK, Europe, North America, Africa and Asia.

Dr Sally Rouse – Marine Scotland

Dr Sally Rouse is the Blue Economy Policy and Engagement Lead within the Scottish Government's Marine Scotland Directorate. Sally has over 10 years' experience of working on marine issues across the university sector, government and industry, both within the UK and internationally. Prior to joining the Scottish Government, Sally worked as marine research scientist at the Scottish Association for Marine Science, where she also served as deputy leader of the Blue Economy Research Area. Sally has held a number of board and committee positions, particularly in relation to offshore energy in Scotland, and the intersection of scientific and technical research with industry and government policies and practices. In her current role, Sally is one of two Blue Economy leads responsible for developing and delivering the Scottish Government's Blue Economy Vision.

Dr Lucy Greenhill - Howell Marine Consulting

Dr Lucy Greenhill is Head of Blue Economy Policy and Practice at Howell Marine Consulting where she leads on services to support planning and delivery of a sustainable blue economy, including the development of UNEP's Sustainable Transition Framework and delivery of Blue Economy Roadmaps for countries such as Indonesia and the Seychelles. Lucy is an expert in ocean governance with extensive experience in the planning and management of marine activities in the public sector, commercial consultancy and academia, both in the UK and overseas. Her interests centre on understanding complex governance systems and promoting adaptive and learning-based approaches which can respond to emerging social and ecological challenges. Lucy has worked in UK government (JNCC) and academia (Scottish Association of Marine Science), and has a history of facilitating engagement between academics, government, users of the sea and planning authorities to develop knowledge and capacity for the development and delivery of sustainable blue economy approaches all over the globe. Lucy is an Honorary Research Fellow at the University of St Andrews.

Andreas Hansen – The Nature Conservancy

Andreas Hansen is a Senior Policy Advisor on Ocean and Conservation Finance Policy at The Nature Conservancy, an NGO. He has extensive policy and managerial experience from a range of UK government departments. Specifically, Andreas worked on delivering the UK's plan for improving air quality. This included overseeing the £220m Clean Air Fund, helping to ensure that the UK's plan to reduce air pollution is carried out in a fair and equitable way. He also led the team managing the UK's G7 and G20 negotiations on agriculture, water and the environment. As Head of International Marine Environment at Defra, he led teams responsible for the marine aspects of the Convention on Biological Diversity, marine species conservation, marine protected areas in areas beyond national jurisdiction, the UK Marine Strategy and SDG14.

7. Weblinks

Weblink text	Full URL
UK Marine Policy Statement	https://www.gov.uk/government/publications/uk-marine-policy-statement
UK high-level marine objectives	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/182486/ourseas-2009update.pdf#:~:text=The%20high%20level%20objectives%20reflect%20the%20full%20range,to%20specific%20marine%20uses%20or%20marine%20environment%20conservation
25 Year Environment Plan	https://www.gov.uk/government/publications/25-year-environment-plan
UK Marine Strategy	https://moat.cefas.co.uk/introduction-to-uk-marine-strategy/
UK Marine Science Strategy	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/183310/mscc-strategy.pdf#:~:text=UK%20marine%20science%20strategy%20A%2015%20year%20strategic,be%20responsible%20for%20the%20delivery%20of%20the%20Strategy
Joint Fisheries Statement	https://www.gov.uk/government/publications/joint-fisheries-statement-ifs
UKRI Sustainable Management of UK Marine Resources	https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/sustainable-management-of-uk-marine-resources/
Natural Capital and Ecosystem Assessment Programme	https://www.gov.uk/government/publications/natural-capital-and-ecosystem-assessment-programme/natural-capital-and-ecosystem-assessment-programme
Dasgupta Review	https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
A Blue Economy Vision for Scotland	https://www.gov.scot/publications/blue-economy-vision-scotland/
Restoring Meadow, Marsh and Reef project (ReMeMaRe)	https://ecsa.international/reach/restoring-meadow-marsh-and-reef-rememare
South West Partnership for Environmental and Economic Prosperity (SWEEP)	https://sweep.ac.uk/
Championing Coastal Coordination (3Cs)	https://consult.environment-agency.gov.uk/fcrm/championing-coastal-coordination-3c-s/#:~:text=The%20Championing%20Coastal%20Coordination%20%283Cs%29%20initiative%20is%20a,Association%20of%20Inshore%20Fisheries%20and%20Conservation%20Authorities%20%28IFCAs%29
2015 Wellbeing of Future Generations Act	https://www.gov.wales/well-being-future-generations-act-essentials-html

Weblink text	Full URL
State of Natural Resources Report	https://naturalresources.wales/sonarr2020?lang=en
Welsh Marine Evidence Strategy	https://www.gov.wales/sites/default/files/publications/2019-09/welsh-marine-evidence-strategy_0.pdf#:~:text=With%20the%20threat%20of%20climate%20change%2C%20amongst%20other,protect%20our%20coastlines%20and%20enhance%20our%20coastal%20communities
Wales Coasts and Seas Partnership	https://www.gov.wales/wales-coasts-and-seas-partnership-casp-cymru#:~:text=The%20Wales%20Coasts%20and%20Seas%20Partnership%20%28CaSP%20Cymru%29,Action%20and%20Advisory%20Group%29.%20Part%20of%3A%20Sea%20fisheries
NI Green Growth Strategy	https://www.daera-ni.gov.uk/articles/green-growth-strategy-northern-ireland-balancing-our-climate-environment-and-economy#:~:text=The%20Green%20Growth%20Strategy%20is%20the%20Northern%20Ireland,tackling%20the%20climate%20crisis%20in%20the%20right%20way
The Blue Belt Programme	https://www.gov.uk/guidance/the-blue-belt-programme
Systems Thinking for Civil Servants	https://www.gov.uk/government/publications/systems-thinking-for-civil-servants
Sustainable Management of UK Marine Resources (SMMR)	https://www.smmr.org.uk/
SMMR network	https://www.smmr.org.uk/network/
SMMR Ocean Partnerships	https://www.smmr.org.uk/ocean-partnerships-a-new-networking-opportunity/
SMMR annual conference	https://www.smmr.org.uk/conference/
Marine Pioneer recommendations	https://zenodo.org/communities/marine_pioneer_sharing/?page=1&size=20
Rapid Readiness Assessment for the Transition to a Sustainable Blue Economy: Pilot project in Trinidad and Tobago	https://thecommonwealth.org/publications/rapid-readiness-assessment-transition-sustainable-blue-economy-pilot-project-trinidad
Rapid Readiness Assessment for the Transition to a Sustainable Blue Economy: Pilot project in Antigua and Barbuda	https://thecommonwealth.org/publications/rapid-readiness-assessment-transition-sustainable-blue-economy-pilot-project-antigua

Weblink text	Full URL
Commonwealth Blue Charter	https://thecommonwealth.org/bluecharter
Africa Blue Economy Strategy	https://www.au-ibar.org/au-ibar-publications/africa-blue-economy-strategy
Eurostat glossary: Satellite accounts	https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Satellite_account