Stakeholder mapping approach adopted in the FIRNS project Enabling Markets for Marine Natural Capital

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Introduction

The aim of the FIRNS project "Enabling Markets for Marine Natural Capital" is to discover aspects related to the legal, governance, social and economic side of environmental markets to propose a future roadmap towards the definition of the principles of a marine code, supplementing strategies already in place in the terrestrial environment (e.g., Peatland Code). To co-produce knowledge adhering to the principle of fair investments for communities and the environment, we found it essential in this project to describe the qualitative nature of the most significative benefits for the local communities that emerging natural capital markets may generate, along with some risks. We refer, in particular, to the possibility to initiate a private environmental market for oyster reef conservation by exploring benefits for the environment and communities through a series of activities that involve discussions with the general public, interested parties and coastal communities, of the main socio-economic issues faced by the community as proposed by the current literature.

To build environmental sustainability into the project, we place communities at the core of the project so that they can be made aware of all the benefits the FIRNS project aims to generate. This is done by involving them and capturing their expressions of interest and desires by questionnaire survey, interviews, and direct community outreach.

Community benefits from nature restoration projects are not always considered. This is a gap identified not just in Scottish or UK environmental markets, but internationally too. However, interest in nature restoration and related carbon/nature markets has increased demand for land that can host these projects, sometimes causing negative effects such as rising house costs and land rent for farmers, as well as impacting livelihoods. The same consideration may apply to the marine environment. The proliferation of restoration projects may soon enter into conflict with other uses. This would generate reduction in space, and lessen margins to operate for fishers, aqua culturists, and marine recreationists, to mention just a few. Because of the newness of the implementation at larger scale of marine restoration projects, we do not know yet if this will result in similar economic problems to those observed on land.

Forecasting opportunities and risks of scaling up marine conservation projects can be debated with stakeholders and groups of communities to ensure that any solutions taken will provide the high levels of environmental integrity and community wellbeing required for a fair and equitable nature-based solution project.

This report presents the process used to select which actors to engage in research activities, which is based on consideration of who might play an important role in shaping marine environmental markets. This builds the basis for three activities (described in different reports), a questionnaire survey targeting the public, interviews addressing stakeholders in research, industry and policy areas, and a workshop / community outreach involving some relevant coastal actors and a coastal community experiencing oyster restoration projects. We will list and briefly describe the broad range

of groups holding a stake, and use information gathered to explore how management decisions can support community wealth by reinvesting value in local economies to their long-term benefit. These three complementary analyses will help address wider stakeholder engagement and distil knowledge co-production to inform a roadmap for nascent marine natural capital markets. Before analysing the thoughts that public and coastal communities have on environmental markets, then, we propose the stakeholder mapping approach adopted and list which actors can play a key role in Scotland in the nascent marine environmental markets arena.

Stakeholders mapping approach

This section proposes an analysis of stakeholders as discussed within the research team and through consultation of the recent literature (Reed, 2023). Stakeholders were discriminated according to their interest and capacity to engage and influence the governance of marine natural capital markets. This analysis is conducted to prioritise stakeholders and to avoid unintentional biases in engagement that have the potential to undermine the legitimacy of co-produced research outputs (Reed et al., 2009). The goal of this analysis is to systematically identify the most relevant stakeholders to derive benefits across different groups by considering their relative interest and influence in the decision-making process.

Methods

Influence and interest are usually reported through an interest-influence matrix to prioritise key players. This is the choice made in this report although a more recent version of this matrix explores 3i's (Interest, Influence, Impact) (Reed et al., 2018) to identify missing stakeholders who are neither interested nor influential but may be significantly impacted. Because our approach is simply based on a desktop analysis of stakeholders supported, where possible, by information available on the webpages of the institution cited, we are not in the position to report on the impacts that would emerge only through a deeper discussion carried out in workshops or focus groups. However, during the interviews carried out with 11 key stakeholders selected to represent industry, research, and conservation interests, we have explored the potential impacts for environment, communities, and several organisations of the nascent natural capital market.

The focus of the analysis includes only activities and markets happening in, or that are strictly related to, the marine environment. Actors reported are operating nationally, regionally, and locally, mainly within Scotland. In addition to the matrix of stakeholders, we have provided a list, based on recent literature, and backed up by the information reported in their respective web pages, of restoration projects recently completed and in the phase of completion.

Results

More than 100 key players were identified across 14 stakeholders' categories. Table 1 provides an overview of each category including examples of organizations. Table 1 summarises the main interests of each stakeholder category, and in some cases their influence or capacity to participate and contribute to shape the governance of marine environmental markets. By referring to this analysis, it is possible to design engagement strategies to facilitate stakeholders' participation and the co-production of knowledge that can provide benefits for the widest possible range of stakeholders. We are conscious that the matrix proposed is partial and many more organizations could be included, especially operators of the supply chain contributing to the delivery of goods and services necessary to carry our project conservation. Categories that seem relevant, according to the significant number of stakeholders, included Environmental NGOs and thinktanks (14), rural

communities (11), recreation and fishing professionals (15). Table 2 reports marine restoration projects recently funded in Scotland, and some underway nearing completion.

Conclusions

We have provided an analysis of stakeholders that may manifest an interest in natural capital and ecosystem markets in Scotland. The purpose of this analysis was to select some key players from different categories for further exploration of perceptions and facts, where possible, around benefits and risks that marine natural capital may deliver for the environment and for people. We hope that by referring to this analysis, further research may generate impacts adhering to the principles of responsible research and generate impacts for a range of stakeholders. We do not pretend to have provided a full picture of the interests available in Scotland in marine natural capital markets, but a first insight into the actors at stake that cannot be ignored if private finance is considered a way forward to co-fund public effort in marine restoration. In addition, we recognise that stakeholder analysis is static, while stakeholders encapsulate dynamism, leading stakeholder analysis to require periodical update to capture relevant changes.

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Table 1: matrix of relevant stakeholders individuated by the research team and involved in several activities within the project to discuss necessary steps, roadblocks for the development of a marine natural capital code and impacts of commodifying ecosystem services provided by marine conservation projects for the environment and communities				
Stakeholder Category	**Key relevant stakeholders**	**Description**	**Interest**	**Power/influence**
Government departments and teams	Defra, Scottish Government, JNCC	There are groups within the UK and Scottish Governments responsible for natural capital and ecosystem markets	Provide policy framework	High capacity to influence the market defining the policy context and framework for scaling up private investment in nature recovery
Government Agencies	Nature Scot, Natural England, Marine Scotland	Agencies with interest in natural capital assessment, valuation, restoration	They have different statutory powers to implement policies on natural capital and environmental markets	High - they have specific functions to engage with environmental markets setting funds for the development of marine environmental markets (Nature Scot and Natural England), with Marine Scotland leading policies and strategies for delivering the Blue Economy Approach
Local Governments	Argyll and Bute, Aberdeenshire, Highlands,	Local authorities with interest in marine resources	They may have an indirect interest in markets	Medium. They do not have a direct interest in environmental markets but are active in marine litter,

	Fife, Lothian, Scottish Borders, Dumfries and Galloway, Ayrshire			planning, safety management, piers and harbours, aquaculture, renewable energies - They might be interested in nature-based solutions that deliver benefits to the communities in their area
Other government bodies	Scottish Enterprise, Highlands and Islands Enterprise, South of Scotland Enterprise, Historic Environment, SEPA	Other bodies that may work indirectly on ecosystem markets, providing Scottish policy initiatives	Facilitate the cross fertilisation of initiatives providing business development advice	Low/medium - can facilitate new emerging markets by providing their point of view in making part of a broad discussion proposing how to develop a low carbon strategy for business and links across the supply chain, how to boost the economy of regions
Emerging voluntary carbon markets relevant for the marine environment	Wilder Carbon, Saltmarsh Code, Blue impact fund	Codes that guarantee buyers and sellers that carbon credits are verifiable	Interested in the policy framework to adapt, expand, or restrict the development of market share	High -operate directly in the formulation of code. Can influence new environmental markets
Financial advisors	Finance Earth, Palladium, Green Finance Institute,	Provide advice to investors on the design of financial products and services	Interested in helping shape policies and regulation, to increase the integrity of markets for their clients.	Medium/high capacity to influence the policy process for market formation

	EFTEC Economics for the Environment, Scottish Development International			
Investors in marine nature-based solutions	Esmee Fairbairn Foundation, Arcadia	Fund to support cultural heritage, protect endangered ecosystems, and promote access to knowledge	Defend the complexity of human culture and the natural world/ help to safeguard and restore unique and biodiverse areas of land and sea.	Medium capacity to influence effective laws and policies supporting the development, monitoring and enforcement of governance interventions that help nations and communities to protect and restore biodiversity and landscapes
Landowners and tenants	Crown Estate, The Wildlife Trust Community Land Scotland Scottish wildlife Trust Farmers Crofters Community Land Scotland	Institutional landowner with state at sea	May have a variable influence on the governance of the markets and shape agreements to protect and valorise the communities that can be affected by the project. Interested in benefit sharing arrangement with suppliers and buyers of ecosystem services	Medium to high (e.g., Crown Estate). Need to be enrolled in nature-based solutions since the infancy of the projects to direct benefits for communities
Suppliers to nature-based solutions	Providers of oyster juveniles, Technology for marine monitoring (water seabed),	Suppliers intervening at the edge of the value chain contributing to the	Offer tools and expertise to facilitate the delivery of projects for marine	Low. Likely not expected to have a real interest and the

	Infrastructure to fix oyster and seagrass at the seabed	achievement of project restoration design	restoration, monitoring, infrastructures, etc.	will to shape the rules of the markets
Environmental NGOs, Thinktanks	RSPB, Nature Scot, Natural England, WWF Scotland, Blue Marine Foundation, Scottish Wildlife Trust, Howell marine Consulting, Marine Conservation Society, Seawilding, Zoological Society London, Project Seagrass, Scottish Seabird Centre, Royal Botanic Garden, Fisheries Management Scotland	Organizations with interest in protection of the marine environment	Concerned about environment and communities. Offer human skills and financial support to deliver marine conservation	Medium-high. They operate with a range of organizations to promote practice and framework for supporting new framework where marine habitat restoration may fit within new environmental market scheme
Ecosystem markets network	Scottish nature finance pioneers,	Organizations that facilitate contact between different stakeholders and the exchange of ideas, and	Contribute to the members learning new insights from the research, and help shape and facilitate the	Low-medium. Idea exchange can facilitate originations of new solutions to ecosystem services generations

	Ecosystem Knowledge Network, Marine Natural Capital Network, Marine Natural Capital Forum Scotland	experiences with interest in marine natural capital and ecosystem services	work through their networks where relevant	
Professional bodies	Chartered Institute for Ecology and Environmental management, Institute of Environmental Management and Assessment	Organization representing professions relevant to ecosystem markets	Provide training in professional standard. Can facilitate the dissemination of carbon footprint analysis	Low. Can engage in policy development but unlikely to have relevant influence.
Rural communities	Scottish Rural Action, Scottish crofters Federations, Rural Youth Project, Scottish Community Alliance, Scottish Community Development Centre, Seawilding, Project Seagrass,	Organizations representing the interests of the community	Can highlight potential negative unintended consequences of ecosystem markets and keen to ensure communities receive direct benefits.	Medium to high. Willing to participate to the discussion of the generation of restoration projects and the creation of the environmental market. The current Scottish policy framework facilitates the early inclusion of communities in the governance of the nature-based solutions proposed

	Community Association of Lochs and Sounds, Fife Coasts and Countryside Trust, Community of Arran Seabed Trust, Craignish Restoration of Coastal and Marine Habitats			
Recreation Water sports Diving Angling	Waterski and Wakeboard Scotland, Royal Yachting Association Scotland, Scottish sub aqua club, Scuba diving Scotland, Scottish anglers national association, Scottish fishermen's Association, Scottish Fishermen Organization,	Organizations promoting recreational and professional activities in the natural environment	Limited direct interest in marine ecosystem markets. Changes in the usability of the seaspace and the quality and amenity of the seascape can be considered important	Low. Likely to expect a limited will and consequently capacity to influence the marine environmental market discourse. However, increasing conflicts and reduced marine spaces may determine a major interest and willingness to intervene.

Fishing aquaculture Seafood	Scottish Creel Fishermen Federation, Anglo-Scottish Fishermen Association, Scottish Fisheries Sustainable Accreditation Group, Scottish Regional Inshore Fisheries Groups, Scotland's Aquaculture, Scottish Seaweed Industry Association, Scottish seafood Association, Seafood Scotland,			
Research	Heriot Watt, SAMS, JHI, University of St Andrews, Zoological Society London	Institutions delivering new knowledge but also operating with policy makers and practitioners to facilitate knowledge transfer	Leading research in the creation of market codes, measuring environmental baselines, impacts to communities, etc.	Low to medium. They may provide new ideas on the impacts to the environment and communities of new marine environmental schemes.

Table 2: list of recent projects (October 2023) delivering marine conservation through public and private funds in Scotland restoration projects - source: https://www.nature.scot/SMEEF - https://www.nature.scot/funding-and-projects/scottish-government-nature-restoration-fund-nrf; https://www.seawilding.org/; https://www.fauna-flora.org/wp-content/uploads/2023/05/FFI_2022_Marine_Restoration_in_Scotland.pdf						
project	**location**	**implementing organization**	**status**	**target species**	**restoration target**	**funder/investor**
Dornoch Environmental Enhancement Project (DEEP)	Dornoch Firth, Highland	Glenmorangie Distillery, Marine Conservation Society, Heriot Watt University	Ongoing since 2014	European oyster	4 million oysters over 5 years	The Glenmorangie
Kilchoan Native Oyster Restoration Project	Loch Melfort, Argyll	Kilchoan Estate	Ongoing since 2021	European oyster	24,000 oysters per year	It seems through a network of NGOs
Loch Craignish Native Oyster Project	Loch Craignish, Argyll	Seawilding, Craignish Restoration of Coastal and Marine Habitats (CROMACH)	Ongoing since 2020	European oyster	1 million oysters over 5 years	National Lottery
Loch Craignish Seagrass Restoration Project	Loch Craignish, Argyll	Seawilding, Project Seagrass, Scottish Association for Marine Science (SAMS)	Ongoing since 2021	Seagrass	Plant up to 1/4 hectare of seagrass	Scottish Government's Biodiversity Challenge Fund
Lochaline Native Oyster Project	Loch Aline, Argyll	Community Association of Lochs and Sounds (CAOLAS), Seawilding	Ongoing since 2021	European oyster	10,000 oysters initially	

Restoration Forth	Firth of Forth	WWF-UK, Edinburgh Shoreline Project, Fife Coast & Countryside Trust, Heriot Watt University, Marine Conservation Society, Project Seagrass, Royal Botanic Garden Edinburgh, Scottish Seabird Centre, The Ecology Centre, The Heart of Newhaven Community, Wardie Bay Beachwatch	Planned for 2022	European oyster, seagrass	Plant 4 hectares of seagrass and 10,000 oysters per year by 2025 / 42 hectares by 2030.	Aviva, Scottish Power Fund, Moondance Foundation
The Wild Oysters Project	Firth of Clyde	Zoological Society London, Blue Marine Foundation, British Marine, Clyde Porpoise CIC	Ongoing since 2021	European oyster	To create a self-sustaining oyster population in the Firth of Clyde (1300 oysters reintroduced as of December 2021)	People postcode lottery from postcode dream trust

Forth Islands Habitat Enhancement	Firth of Forth	RSPB Scotland	ongoing since2022	invasive species	removal of invasive non-native species, namely tree mallow, which has become widespread across the Forth islands and has a major impact on breeding seabirds	
Seawilding / Loch Broom	Loch Broom, Little Loch Broom and Old Dornie, Achiltibuie	Seawilding	ongoing since 2023	European oyster	A native oyster nursery is being established to cultivate 100,000 native oysters per year for three years, to regenerate the depleted oyster beds in Loch Broom, Little Loch Broom and Old Dornie, Achiltibuie	
Native Oysters / Loch Melfort	Loch Melfort	The Kilchoan Estate in collaboration with Seawilding	ongoing since 2023	European oyster	released 24,000 juvenile oysters	

Native Oysters / Lochaline	Lochaline	CAOLAS (Community Association of Lochs and Sounds), the Lochaline Marina Community Development Committee, as well as Lochaline Primary School	ongoing since 2023	European oyster	Up to 20,000 native oysters will be grown in suspended cages	
Native Oysters / Loch Gair	Loch Gair bay	MacArthur Green Consulting	ongoing since 2023	European oyster	assessing Loch Gair bay to establish whether a viable population, if any, of native oysters exists and what the potential might be for restoration and reinstatement.	

Horse Mussel Restoration / Berwickshire	Berwickshire	Berwickshire Marine Reserve	ongoing since 2023	mussel	undertaking baseline mapping and site condition assessment of horse mussels within the Reserve. Additionally, they will be developing a management plan for sustainable marine activity and promoting horse mussel bed recovery.	Blue Marine Foundation
RSPB	Loch Gruinart, Islay	RSPB Scotland	2021	saltmarshes	Protection of saltmarsh habitat at RSPB Loch Gruinart, Islay	
Survey vessel to support community outreach and marine restoration, monitoring and enhancement work	Arran	Community of Arran Seabed Trust (COAST)	2001		Survey vessel to support community outreach and marine restoration, monitoring and enhancement work.	Survey vessel to support community outreach and marine restoration, monitoring and enhancement work
Sand dune restoration to reduce wind erosion and support tourism in the West Sands.	West Sands	St Andrews Links Trust	2001	sand dunes coastal habitat	Sand dune restoration to reduce wind erosion and support tourism in the West Sands.	Apart from trust Local landowners

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