Defra (group) Research Priorities for UKRI's

Sustainable Management of UK Marine Resources (SMMR) Programme

Making of Defra group's research needs

This document has been compiled using the latest drafts of the Area of Research Interests, the Marine and Fisheries evidence needs document, and the Marine Science Co-ordination Committee (MSCC) roadmap. Former documents have been developed collectively with Defra, the Defra family (CEFAS, JNCC, Environment Agency, Natural England), MSCC and the Devolved Administrations. Lastly, this document has been reviewed by the M&F Evidence Steering Group which includes members of the Defra family and the Marine Maritime Organisation (MMO).

Defra group's research needs

Clean and safe seas: We need to protect the marine environment from pollution and improve measures to reduce impacts by better process, methods, novel technology and communication to support marine policy. Research is required to:

- Determine the socio-economic costs of (plastic) litter on marine wildlife, ecosystems and maritime industries and the costs incurred from changing to other materials, including the potential benefits to be made from new industries including SMEs;
- Understand the full benefits of offshore renewables and identify and mitigate their environmental impacts by establishing socio-economic evidence to provide information to influence marine policy and development decisions.
- Understand current and future risks from chemical and microbial contaminants of emerging concern and pollution including, marine plastic litter, emergencies (e.g. oil spills), and man-made underwater noise;

Healthy and biologically diverse seas: There is a need for evidence on the distribution, health, function and resilience of marine ecosystem services as well as their value. Research questions include:

- What are the social, economic and cultural impacts of marine policy, management and interventions on stakeholders and coastal communities?
- How ecologically, economically, socially and culturally effective are marine protected areas and how can these factors be used to improve design and effectiveness?
- How can we monitor and evaluate the ecological, social, economic, and cultural costs and benefits of marine protected areas?
- Using climate-smart management, how do we best protect marine biodiversity that might change as a result of climate change?

Productive seas: The UK's ambition is for sustainable development in the marine sector while increasing its productivity. Research is needed to:

- Assess socio-economic information to support and incentivise a change to secure the long-term sustainability of seafood exploitation whilst reducing the environmental impact of exploitation;
- Develop innovative technologies and foster industry and business engagement to support sustainable fisheries and aquaculture, offshore energy production, maritime transport, carbon sequestration and blue carbon, and recreation;
- Integrate fisheries monitoring in a systems approach to manage and maintain sustainable productivity, integrate marine planning systems to protect habitats and species, and reduce the industry's costs to enable economic development;
- Improve fish stock assessments over a greater range of species and improve management of freshwater, migratory and marine fisheries, and protected species.
- How do we put together economic, social and cultural factors in a framework to assess the value of services provided by the marine environment and the cost associated with environmental degradation?

Ocean and coastal processes: Effective measures for adaptation and mitigation to climate change risks are needed to be developed by research to:

- Further our understanding of how climate change is affecting the health of the ocean, and how to mitigate the multiple stresses it causes?
- How do we differentiate between anthropogenic and non-anthropogenic impacts and mitigate for them to ensure effective protection of the marine environment?
- Assess how marine protected areas can act as nature-based solutions to the effects of climate change by sequestering carbon.
- What social and economic opportunities do marine nature-based solutions to climate change and climate resilience offer?

Overarching thoughts:

- How to use effective catchment to coast planning to mitigate coastal and offshore impacts, and further understand key land-coastal-ocean interactions.
- How do we develop and encourage technological solutions and innovative practices to support the development and delivery of marine policy?
- How do we develop and implement marine environment management approaches and nature-based solutions to achieve Good Environmental/Ecological Status throughout UK waters?
- How can we enhance local decision-making through community participation and engagement?
- What should we monitor in the marine environment in order to effectively address relevant policy needs and how can this be improved?
- How should we assess the economic, social and cultural value of the marine environment for policy making purposes?
- How can different disciplines come together to show how a natural capital approach can be used in practice to aid decision making in the marine environment?
- How best to model accrual of ecosystem services benefits and trade-offs at different scales, from that of coastal communities to the societal.
- What is the importance/interaction/link between ocean literacy – stewardship – and behaviour change?

- How best to Integrate social and economic sustainability into environmental interventions?
- How should we develop co-design, participatory and deliberative approaches to support the design of effective interventions?

Overarching topics

- A multi-disciplinary approach to fisheries management: understanding how to integrate stock status with associated species and wider environmental factors, and also connecting that to environmental and social data
- Cultural ecosystem services and integration into a natural capital approach
- Modelling accrual of ecosystem services benefits and trade-offs at different scales, from that of coastal communities to the societal.
- Ocean literacy – stewardship – behaviour change
- Social and cultural impact of the marine policy and management on coastal communities
- Integration of social and economic sustainability into environmental interventions
- Social and economic evaluation of MPAs
- Development of co-design, participatory and deliberative approaches to support the design of effective interventions
- Transition from managing UK marine biodiversity as part of EU to managing under the UK Marine Strategy
- How can we make UK MPAs climate-smart?
- Blue carbon
- Valuation of ecosystem services
- Natural capital accounting
- Systems approaches
- Nature-based solutions to climate change adaptation
- What are the barriers and potential of marine bioenergy?
- Role of marine in net zero