



### **SUPER DTP – Year 3 Call for PhD Studentship proposals**

The Scottish Universities Partnership for Environmental Research Doctoral Training Partnership (SUPER DTP) is pleased to announce its third call for PhD studentship proposals.

The SUPER DTP addresses an interdisciplinary "catchment to coast" research portfolio, supporting the holistic study of the ecological dynamics of systems from headland rivers and catchments through lowland regions and riparian systems to estuarine and coastal waters and marine ecosystems.

The three themes under the SUPER "Catchment to Coast" umbrella are:

#### **Environmental Dynamics**

Hydrology  
Sedimentology  
Coastal Processes  
Erosion Control  
Ecosystem Engineering  
River Ecology  
Flood Management

#### **Biodiversity and Ecosystem Function**

Ecosystem services  
Ecology and Conservation

#### **Challenged Ecosystems**

Climate  
Multiple Stressors  
Resilience  
Resource Management  
Societal Well-being  
Legacy Waste

The third call for proposals under the SUPER DTP remains broad in scope, and **we invite applications across the full SUPER remit**, which embraces terrestrial, freshwater, and all marine habitats. This includes, but is not limited to, studies of: ecology; biodiversity; biological invasions; ecosystem change; environmental physics and chemistry; modelling; mechanistic studies; social and economic studies; and emerging issues.

We would particularly welcome applications covering:

- The physical sciences
- Socio-economic aspects of the SUPER remit
- Freshwater, terrestrial and truly-catchment wide projects
- Projects that address research needs of policy delivery bodies
- Contributions to post-COVID-19 green-recovery

Non-HEI organisations have been invited to suggest areas of research that they may, *in principle*, be willing to support. This information is below, but please keep checking back as this list may expand. We have areas from:

- [The INSITE programme](#)
- [Scottish Aquaculture Innovation Centre](#)
- [Scottish Natural Heritage \(soon to be Nature Scot\)](#)
- [Marine Scotland Science](#)
- [Marine Management Organisation](#)

You may also find it useful to view the project title of proposals funded under the SUPER DTP in [Year 1](#) and in [Year 2](#).

The SUPER partners are St Andrews University (lead), Aberdeen University, Edinburgh Napier University, Heriot-Watt University, the University of the Highlands & Islands, University of Stirling, University of Strathclyde & the University of the West of Scotland.

Check out the website at <https://superdtp.st-andrews.ac.uk/>

# INSITE

The aim of the [INSITE Programme](#) is to produce independent science leading to a greater understanding of the influence of man-made structures on the North Sea ecosystem. PhD proposals covering one of the three main challenges outlined below are invited. If you have any queries related to these three areas, you can contact [Richard Heard](#), INSITE Programme Director.

## INSITE Challenge 1: Understanding the role of man-made structures as an inter-connected hard substrate network in the North Sea.

This builds upon connectivity analyses in INSITE's foundation phase that have established a baseline understanding of what species are present on man-made structures, how they may disperse and how ecological networks may develop and establish through the presence of structures alongside natural hard substrate and wrecks. For example, the cold-water coral *Lophelia pertusa*, which is typically found in deep waters in the North Atlantic, was first reported on northern North Sea oil platforms in the late 1990s. Subsequently, with evidence for a self-seeding population and larval biological parameters established larval dispersal modelling through INSITE Phase 1 suggests this key deep-water ecosystem engineer has spread across the North Sea on man-made structures.

These man-made structures therefore now seem to be playing a significant role in the regional ecology of this species. Projects are needed to fill gaps in understanding of the larval biology of this and other ecologically significant fouling organisms on appropriate spatial and temporal scales so that models of species dispersal and network connectivity can be developed and optimised.

## INSITE Challenge 2: Understanding the role of man-made structures as artificial reefs in the North Sea.

The current role of man-made structures as artificial reefs in the North Sea has not been quantified and we have no understanding of what effects the projected future expansion of marine renewable structures may have upon ecosystem function. The INSITE foundation phase has revealed that such artificial reef effects may extend through the trophic system with evidence, for example, that top predator foraging by grey seals has been altered by the presence of man-made structures. This challenge should address key questions including: What is the magnitude of effect of artificial substrates on biomass and composition of both sessile and mobile fauna including ecologically important fish and marine mammals? What is the role of platforms as de facto marine reserves and do they contribute to a coherent network along with other areas where human activities are limited? Specifically, can any benefits for the designated Marine Protected Area (MPA) network be quantified from past or future networks of hard infrastructure (e.g. oil/gas platforms and offshore wind infrastructure)? Work on this challenge will be informed by the knowledge available in other regions where the regulatory regime has allowed so-called rigs-to-reefs development rather than requiring platform removal. For example, in the US Gulf of Mexico and offshore California, the US Department of the Interior has approved approximately 400 rigs-to-reefs programmes since the mid-1980s. Proposals addressing this challenge will build upon understanding of artificial reefs worldwide and develop a robust new science evidence base for the present day and potential future role of man-made structures as artificial reefs in the North Sea.

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### INSITE Challenge 3: Ecological monitoring and assessment of man-made structures as whole systems in the North Sea ecosystem.

Man-made structures have been installed across the North Sea from the shallower, current-swept south to the deeper northern North Sea where finer muddy sediments are more prevalent. Such natural gradients have profound effects on the environments surrounding the structures. For example, the seabed at the base of oil platforms in the deeper northern North Sea is frequently covered with piles of accumulated drill cuttings whereas cuttings in the southern North Sea have been dispersed in the more energetic near-bed currents. The ecological implications of disturbance to drill cuttings piles during platform decommissioning are poorly understood creating uncertainties on the best environmental options. The existing evidence base also relies primarily upon classical benthic ecological and geochemical assessment giving great scope for the application of new methodologies including environmental DNA (eDNA) and in situ approaches to record contaminant mobilisation. In terms of marine renewable energy installations, the ability to monitor and understand the ecological impact assessment of turbine footings and subsea electrical cables is limited, especially given the numbers of installations projected for 2030. Proposals addressing this challenge may use existing platforms and sensors to develop smart monitoring and assessment approaches that consider man-made structures as whole systems rather than focussing on subsets of the structures. Innovative in situ approaches for monitoring and the use of autonomous systems to expand the spatial and temporal domains of this ecological assessment will be needed to deliver on this challenge. Projects tackling this challenge should apply existing platform and sensor technologies.



Skills & Talent.

The purpose of SAIC is to transform Scottish aquaculture by unlocking sustainable growth through innovation excellence. They fund and support commercially relevant, collaborative research, and would be interested in proposals related to the three priority areas listed below. If you have any queries related to these three areas, you can contact [Mary Fraser](#), SAIC Head of

1. Developing knowledge around ways to minimise the effect of plankton upon Scottish Aquaculture operations.
2. Innovations around mitigating or quantifying environmental impacts of Scottish Aquaculture, including monitoring and eDNA.
3. Innovations around new methods and practical solutions for non-lethal seal deterrents.



Scottish Natural Heritage (soon to be Nature Scot) would consider proposals that fit within the broader list of priority areas of research noted below, and for further enquiries related to these please contact [Carol Hume](#). Also provided below are details and contact points for three specific SPA seabird projects.



Priority areas of research:

- Understanding connectivity of marine populations (particularly PMF species) to assist in developing measures to increase resilience to pressures, including climate change impacts
- Understanding the ecology and pressures on fish species and their supporting habitats in nearshore waters
- Investigating ecological change in relation to mobile fishery exclusions around offshore wind arrays
- Impacts on marine ecosystems of man-made structures and activities on the coast and in the sea
- Analysis of change in Scottish coastal habitats (e.g. investigating the value of mobility of sand dune systems in the context of adjacent habitats)
- Better understanding of the ecology of kelp species and habitats, especially in relation to the ability to recover ecosystem functions following harvesting activity
- Study of diets and foraging / roosting locations of inshore wintering wildfowl (grebes, divers, seaduck) in pSPAs in Scotland
- Investigating seabird behaviour in tidal-stream environments
- Movements of diadromous fish (excl. salmon) in Scottish coastal and inshore waters
- Clarifying the linkages of marine habitats and/or species in relation to functionality and ecosystem services
- Exploring the potential of new technologies to assist in marine and coastal survey and monitoring work
- Assessing the use of voluntary versus statutory approaches to managing marine wildlife tourism
- Analysing Scottish Marine Animal Stranding scheme data to improve understanding of marine mammal behaviour and human impacts

Brief title & Contact Person for enquiries	Specific Aims & Objectives
The uses of artificial intelligence and digital imagery techniques for monitoring of Special Protection Area seabird colonies  Contact: <a href="#">Alex Robbins</a>	The populations of breeding seabirds in Scotland are facing unprecedented pressures, including many associated with or exacerbated by rapid climate change. Robust monitoring of breeding numbers and productivity across representative colonies is essential to track and understand these impacts. SNH also have statutory obligations to

	<p>assess the condition of SPA colonies and to provide robust advice with respect to marine developments that may affect these populations. However, traditional field monitoring methods are resource intensive and hence costly to sustain at the levels required to provide systematic and robust evidence of change and SNH are currently reviewing our Site Condition Monitoring programme.</p> <p>The main aim of this PhD would be to develop and evaluate novel and less resource intensive methods (i.e. automated image recognition and data extraction from digital imagery) to maintain our understanding of population numbers and explore monitoring of productivity. We also want to go through a process of calibrating the methods with current approaches, and to establish baseline standards. A second aim is that we would like to find methods that could enable widespread monitoring of colonies with connectivity to windfarms that could be undertaken by developers with clear methodologies and analyses that could be easily replicated.</p>
<p>SNH is carrying out a programme of work to inform future approaches to monitoring and management of inshore wintering waterfowl (divers, grebes, seaduck) plus European shag in marine Special Protection Areas in Scotland.</p> <p>Two potential research areas have been identified under this program.</p> <ol style="list-style-type: none"> <li>1. Methodological and analytical approaches to monitoring and tracking changes in populations and distributions of inshore wintering waterfowl (IWW) across marine SPAs in Scotland.</li> </ol>	<p>There are a range of specific topics that could fall within this research area, including:</p> <ul style="list-style-type: none"> <li>• Application and development of geospatial modelling and statistical methods to facilitate combination of data from a variety of sources and platforms (e.g. digital aerial surveys, Wetland Bird Survey (WeBS) counts and targeted vantage point counts), collected at varying spatial and temporal scales, to develop robust population indices for IWW at site and network level.</li> <li>• Investigation of limitations and sources of bias in IWW survey data and development and evaluation of practical methodological approaches to reducing or eliminating these</li> <li>• Investigation of use of drones for image capture for survey of IWW and of</li> </ul>

<p>Contact: <a href="#">Kate Thompson</a></p>	<p>automated image recognition and/or Citizen Scientists for data extraction.</p>
<p>SNH is carrying out a programme of work to inform future approaches to monitoring and management of inshore wintering waterfowl (divers, grebes, seaduck) plus European shag in marine Special Protection Areas in Scotland.</p> <p>Two potential research areas have been identified under this program.</p> <p>2. Modelling critical habitats for inshore wintering waterfowl at individual site level</p> <p>Contact: <a href="#">Kate Thompson</a></p>	<p>This would develop approaches for characterising, modelling and mapping critical foraging and roosting habitats for inshore wintering waterfowl within marine SPAs in Scotland. The project would draw on an SNH review of diets and foraging ecology of these species and a scoping study investigating potential availability of data for mapping supporting habitats for some principal prey types, particularly for shellfish-eating seaducks.</p> <p>The project would also investigate approaches for evaluating the impacts of anthropogenic activities (e.g. development of a framework within which to assess effects of displacement of birds from particular locations within an SPA at site and wider population levels).</p>

### MSS – Renewables and Energy Programme

#### 1. The role of top down processes in regulating seabird populations in Scotland

- Many seabird populations have declined in Scotland over the past few decades, while others have increased.
- These changes have been linked to a range of pressures, both natural and anthropogenic.
- To date, much research has focused on the impacts of bottom up, climate mediated drivers of seabird population demography.

- However, far less is known regarding potential top down impacts of fisheries and predators, both introduced mammals and native avian predators (e.g. skuas, gulls, eagles).
- Utilising the results of the first comprehensive seabird census conducted in over two decades (Seabirds Count, due to be completed in 2021), this project would investigate the factors driving observed spatial differences in population trends for key species.
- Understanding the drivers of seabird population trends will allow conservation actions and mitigation measures to be identified, along with priority areas, helping build resilience to future changes.
- Contact [tom.evans@gov.scot](mailto:tom.evans@gov.scot) and [Richard.howells@gov.scot](mailto:Richard.howells@gov.scot)

## 2. Ecology of the Manx shearwater population on Rum

- The Manx shearwater population on Rum is of international significance being one of the top three colonies in the World. However, the ecology of the species on the island has been little studied.
- Manx shearwater are potentially impacted by both pressures at the colony (e.g. predation by rats or flooding of burrows) and by pressures at sea/away from the nest site (e.g. incidental fisheries bycatch, attraction to lights).
- This study could combine tracking of shearwaters to better characterise their at sea habitat use and behaviour and studies at the colony. At sea Manx shearwater may be exposed to offshore developments around west of Scotland but also further afield, e.g. the Irish Sea Front area which is a shared foraging area across multiple populations of the species across the UK and Ireland.
- Contact [tom.evans@gov.scot](mailto:tom.evans@gov.scot) and [Julie.miller@gov.scot](mailto:Julie.miller@gov.scot)

## 3. Understanding biases in seabird tagging studies

- Tagging of seabirds using GPS tracking and other devices (e.g. accelerometers and time-depth recorders) is widespread and provides important data for informing management of seabird populations (e.g. foraging ranges and utilization distributions), however it is still poorly understood to what extent the behaviour of tagged individuals is representative of the wider colony.
- This study could include two components: 1. An experimental study, 2. Development of analytical approaches for making combined inferences from tagging and at sea datasets.
- Part 1: For an exemplar/key species data would be collected on bird behaviour from tags, with nest pairs undergoing different treatments with respect to tagging and handling. Could also compare behaviour of birds tagged in different parts of colony.
- Part 2: Making combined inferences on seabird foraging distributions using at sea observations and tracking data. This would look to develop statistical approaches for combined inference for colony specific at sea distributions by combining tracking data and at sea observations.
- Contacts: [Julie.miller@gov.scot](mailto:Julie.miller@gov.scot) and [tom.evans@gov.scot](mailto:tom.evans@gov.scot)

**4. Developing an individual based model to simultaneously assess multiple effects of offshore wind developments on breeding seabirds**

- The key effects of offshore wind developments on seabirds are generally considered to be from displacement, barrier effects and collision mortality. To date these pressures have been assessed separately using different tools. As more empirical data comes available on how seabirds behave at sea and in the vicinity of constructed wind farms more complex modelling approaches that can incorporate more detailed knowledge of seabird behaviour become practicable.
- This project would develop an individual based modelling approach for breeding seabirds to assess the multiple effects together and be developed such that emerging data from post-construction monitoring on seabird movements can be used in models.
- Contact: [tom.evans@gov.scot](mailto:tom.evans@gov.scot)

**5. An age old problem: Age and sex in the colony and population structure**

- Does age at first breeding decline in declining populations?
- Do colonies show any patterns in size and sex ratio of offspring?
- Are any prospecting sub-adults overwhelmingly one sex?
- Are new colonies a mix of experienced and youngsters?
- Both desk and field based study on demography, data mine census for age information for those species that are morphologically identifiable to age/gender.
- Any potential in LAMP DNA field kit development for in-situ sex determination, if validated could provide quick field identification of sex, allowing for targeted tagging and or tag patterns (i.e. leg rings in x species coloured dependent on sex)
- Contact: [Julie.miller@gov.scot](mailto:Julie.miller@gov.scot)

**6. Impact of particle motion on benthic invertebrates**

- Measure the level of particle motion generated by anthropogenic activities in the field, particularly those relevant to offshore renewable energy;
- Determine threshold levels of particle motion that cause injury or detrimental changes in invertebrates;
- Investigate the effect of particle motion from noise generated by offshore wind farms on sensitive species in the field and/or laboratory;
- Develop guidelines or noise mitigation strategies if appropriate, such as defining a 'zone of influence' around a source of noise at which the sound level may have an adverse effect on the animals present within it.
- Contact [Marion.Harrald@gov.scot](mailto:Marion.Harrald@gov.scot) and [Hannah.Millar@gov.scot](mailto:Hannah.Millar@gov.scot)

**7. Small cetacean communities in a changing North Atlantic**

- What species do we detect, and are there spatial and temporal patterns in their occurrence? Use existing acoustic monitoring data, collected at both near-shore and offshore sites (between 2017 – 2021) to examine the spatial and temporal variability in occurrence of

small cetacean species in the waters west of Scotland, e.g. common, bottlenose, Risso's, white-beaked, Atlantic white sided dolphin, especially in relation to marine protected areas for cetaceans. This will use machine learning algorithms to classify cetacean whistles to species.

- What parameters influence the distribution of dolphins, and does this differ between species? Use habitat preference models (e.g. generalized additive models with generalized estimating equations) to characterise the oceanographic and biological influences on small cetacean occurrence.
- How good are habitat models at characterising dolphin distribution? Include other types of survey data from a variety of sources (e.g. dedicated visual surveys, surveys from platforms of opportunity, citizen science) to test and validate habitat preference models.
- Is fish presence a good indicator of dolphin occurrence? Link dolphin habitat preference to prey abundance, using ground fish survey data from western Scottish waters (e.g. ICES Database of Trawl Surveys).
- How will climate change affect the distribution of certain species in Scottish waters? Use modelled climate change scenarios with habitat preference models to predict changes in species occurrence in relation to changing distribution of prey.
- Contact [Ewan.Edwards@gov.scot](mailto:Ewan.Edwards@gov.scot) and [Ross.Culloch@gov.scot](mailto:Ross.Culloch@gov.scot)

#### **8. Minke whale foraging ecology in the Scottish MPA network**

- Where and when are minke whales detected? Use existing acoustic monitoring data to investigate the occurrence of minke whales both within and outside of proposed MPAs.
- Is it possible to determine exactly where and when minke whales vocalise? Targeted acoustic monitoring to examine the vocal behaviour of minke whales in Scottish waters. This will demonstrate the potential of using acoustic monitoring in the conservation of minke whales.
- What parameters influence minke whale distribution? Habitat preference modelling of minke whales to investigate oceanographic drivers of their distribution.
- How healthy are minke whales in Scottish waters? Use unmanned aerial vehicles to monitor minke whale health, age, reproductive status and body condition e.g. 3D photogrammetry and blow samples for epidemiology and hormone analysis.
- Point of contact: [Ewan.Edwards@gov.scot](mailto:Ewan.Edwards@gov.scot) and [Ross.Culloch@gov.scot](mailto:Ross.Culloch@gov.scot)

#### **9. Mapping the global offshore energy transition and ocean sprawl through synthetic aperture radar data.**

- Develop and test algorithms to identify offshore oil and gas platforms and wind turbines using SAR data. Ground truth with spatial databases in the UK, USA and Australia.
- Apply algorithms to produce a global offshore energy infrastructure map and quantify the contribution of offshore energy to 'ocean sprawl'

- Apply terrestrial land use land change techniques to the marine environment (Ocean use and Ocean Change) to quantify energy transition including removal of oil and gas platforms, rig-to-reef deployment and installation of offshore renewables.
- Contact [Sally.Rouse@gov.scot](mailto:Sally.Rouse@gov.scot)

#### **10. Understanding the influence of subsea cables and pipelines on the movement patterns of mammals, birds and commercial fishing vessels**

- Integrate seal and bird tracking data with spatial fisheries data to understand the extent to which subsea pipelines and pipeline protection structures directly influence the foraging behaviour of predators relative to indirect influences on foraging behaviour through modification of commercial fishing patterns.
- Contact [Sally.Rouse@gov.scot](mailto:Sally.Rouse@gov.scot)

#### **11. Salmon ~ marine renewables interactions**

- Review potential for negative and positive interactions between salmon smolt and marine renewables (offshore wind, wave and tidal stream)
- Use existing salmon smolt tracking and trawling data from the east coast of Scotland to better understand the potential exposure of salmon smolt to marine renewables related pressures.
- Consider the relative exposure to marine renewables that different salmon populations may experience, utilising existing genetic assignment data where relevant.
- Capitalise on opportunities for gathering additional acoustic tagging or trawling data to help inform the assessment of the impacts of marine renewables on smolt in the marine environment.
- Contact [Robert.Main@gov.scot](mailto:Robert.Main@gov.scot) and [Ross.Gardiner@gov.scot](mailto:Ross.Gardiner@gov.scot)

#### **MSS : Fisheries Assessment and Advice programme**

#### **12. A sea of change: is deteriorating individual condition affecting the population dynamics of herring?**

Background: Melting arctic ice is having a drastic impact on the environment of the North Atlantic, including changes in productivity patterns and food web structures[1]. These large-scale changes have cascading effects on local and coastal productivity in the Northeast Atlantic. The fate of commercially important fish species will depend on their ability to track and adapt to these changes. In order to sustainably manage those resources we need to be able to assess and predict how environmental changes influence population dynamics. Trait-mediated indirect effects can influence population growth rate, age structure and the condition of individuals can be used as early-warning signals of those effects[2,3]. It is therefore valuable to explicitly introduce functional responses of vital rates to condition in our current population models both to forecast stock status and manage fisheries in a manner which ensures their sustainability.

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Northeast Atlantic herring has a complex life history with multiple environmental dependencies at different life stages. This leads to large scale multi-decadal range shifts as well as different stocks with different spawning areas and timing which therefore will have different sensitivities to the way the North Atlantic is currently changing. Currently, some stocks are not performing as expected given their exploitation status, and we are left speculating that environmental factors may be playing a larger role than expected in the stock status.

Outline: This project will determine how condition influences vital rates in herring using information from scientific surveys and catches. The student will receive training in hierarchical statistical modelling and deep learning modelling techniques which they will apply to determine how condition changes through the life history of individuals using otolith readings combined with physiological information. We will use the unique long time series of otoliths for the species to determine how body growth dynamics changed over the past decades. The student will then use longitudinal modelling approaches to determine whether growth dynamics can be associated to environmental changes and used as early-warning signal for shifts in population growth rate and age structure. Finally, the student will be trained in population modelling and introduce informed condition functional responses in the current herring population model to help improve stock assessment. In addition to the training in quantitative skills, the student will have the opportunity to be fully engaged in sampling and gain relevant at-sea experience.

Contact: Neil Campbell, +44 7907 638 166, [neil.campbell@gov.scot](mailto:neil.campbell@gov.scot) or [neil.campbell@gmail.com](mailto:neil.campbell@gmail.com)

#### References:

1. Barton, A. D., Irwin, A. J., Finkel, Z. V & Stock, C. A. Anthropogenic climate change drives shift and shuffle in North Atlantic phytoplankton communities. *Proc. Natl. Acad. Sci. U. S. A.* 113, 2964–9 (2016).
2. Clements, C. F., Blanchard, J. L., Nash, K. L., Hindell, M. A. & Ozgul, A. Body size shifts and early warning signals precede the historic collapse of whale stocks. *Nat. Ecol. Evol.* 1, 188 (2017).
3. Susdorf, R., Salama, N. K. G. & Lusseau, D. Influence of body condition on the population dynamics of Atlantic salmon with consideration of the potential impact of sea lice. *J. Fish Dis.* (2017). doi:10.1111/jfd.12748

### **13. The effects of parasites on marine food web structure and dynamics: new ways to improve accuracy and ecological realism.**

Aim: This project aims to explore new ways to incorporate parasites into marine food webs for a better understanding of how parasites affect food web structures and dynamics in commercially important marine fish species in Scottish waters.

Proposed objectives:

- 1) Carry out a literature review on existing parasite inclusion methods in marine aquatic food webs and on the main parasite species that affect the main nodes of the food webs of interest.
- 2) Ground truthing through traditional dissection of relevant marine fish species (and potentially invertebrates) in food webs of interest.
- 3) Comparing the effects of existing parasite inclusion methods on food web topology and structure based on literature search and ground truthing data.
- 4) Develop networks with stakeholders in the marine fishing industry to identify the main species of interest and parasites of specific concern to ensure relevance with regards outputs from the project to both the industry and Scottish Government Future Fisheries Management aspirations.
- 5) Devise potential new methods of parasite data collection (e.g. eDNA samples), including pilot studies.
- 6) Develop new parasite inclusion methods and compare with existing ones.
- 7) Develop visually easy to grasp aids to present data/results to a broad range of stakeholders that have an interest in management of commercially important marine fish species or species with key roles in ecosystem functioning.

For further information contact Dr. Campbell Pert at [Campbell.pert@gov.scot](mailto:Campbell.pert@gov.scot) or telephone 01312 444208.



Marine  
Management  
Organisation

The Marine Management Organisation are interested in interdisciplinary work that begins to untangle the complex challenges facing us, including those listed below.

For further enquiries, please contact [Aisling Lannin](mailto:Aisling.Lannin).

- Balancing development, restoring nature and achieving the net zero ambitions.
- Using the regulatory system to improve the outcomes for Good Ecological Status (GES) descriptors.
- Multi-use, multi-restoration actions using marine planning and licensing.
- Integrated management of all industries including fisheries in one system that can improve outcomes for climate and biodiversity.