



PROJECT PROPOSAL FORM

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The level of detail you provide will determine the extent to which further discussion may be required with the relevant programme director to ensure suitability.

desk-based/data studies that will easily facilitate remote working and remote supervision are welcome, as well as in person and/or experimental based projects where appropriate.

What's Next?

Please send your completed form to the MASTS Programme Coordinator & Deputy Dean of Grad School, Dr Emma Defew (masts@st-andrews.ac.uk) before the deadline.

Following submission of the form, it will be channeled to the leaders of the various Masters programmes that operate within the MASTS community and a representative from the most relevant programme or department will get in touch to discuss the project scope, delivery and the selection of an appropriate student. If more than one student expresses an interest in your project, you will need to ensure discussions take place to enable the most suitable student to be matched with your project. The projects themselves usually won't start until May or June.



Making the Most of Masters

MASTS - Making the Most of Masters – Project Proposal Form

Name and address of Organisation:

NatureScot
Great Glen House, Leachkin Road, Inverness, IV3 8NW.

Name of the key contact in Organisation:

Chris Leakey

Contact e-mail and phone number:

chris.leakey@nature.scot

Title of proposed project:

Marine licensing in the Clyde – trends and policy drivers

Project outline and intended outcomes:

Marine plans and their policies provide a strategic framework that guides decision-makers, particularly for the licensing of marine developments. However, Scotland's marine planning and licensing processes are relatively young, with scope for review and refinement. We have a two-tier marine planning system (national and regional); the national plan is undergoing revision, and the first of the regional plans being prepared (including for the Clyde marine region), so the opportunity to take stock is timely.

Research Proposal: Trends in marine licence applications and decisions (including licence conditions for environmental mitigation) for the Clyde region, the coherence of decisions with adopted marine plan policy (National Marine Plan), and the potential for emergent regional policy (draft-Clyde Marine Plan) to enable clearer plan-led decision-making.

This MSc research project opportunity would make use of a list of licence applications compiled by the Clyde Marine Planning Partnership (hosted by NatureScot), combined with publicly accessible information on marine licenses that are granted at <https://marine.gov.scot/marine-licence-applications>. It would involve sifting the materials to compile key information into a database, structured in a way suitable for tackling the chosen research questions. The analysis could then trigger appraisal and discussion of how to improve licensing processes and their relationship with marine plans as decision-making frameworks.

Research question may include (to be tailored and adapted by a student and supervisory team)

- Has the type and mix of marine development applications changed? Is there a spatial pattern to this within the Clyde marine region?
- Are there patterns/trends (spatially and temporally) to which type(s) of development application are licensed?
- Has/How has the use of license conditions for environmental mitigation changed over

time? Are any of these changes particular to certain development types?

- Is the issuing of licences and license conditions consistent with (or contrary to) existing marine plan policy (NMP1), or is this hard to determine from the specificity of either policies or conditions? Would the draft policies for the Clyde Marine Plan help to plug any identifiable deficiencies in the marine licensing decisions and conditions?
- Is there consistent reference to policies within plans across applications for the same types of developments?) i.e. are applicants demonstrating awareness of policies that they should aim to be compliant with?

If access to other documentation is possible (e.g. from Marine Directorate Licensing and Operations Team) then it may be possible to explore further questions, such as:

- Do there appear to be re-occurring reasons for license rejections?
- Is there any evidence of enforcement or monitoring to determine if conditions have been applied and successful in mitigating environmental impacts?

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

This project would be suited to a student with an interest in the policy and regulatory aspects of marine management. It could be largely done remotely/online but we would be able to work from or visit our offices as appropriate.

NatureScot hosts the staff of the Clyde Marine Planning Partnership, which is partly what helps us enable this project.

It should be possible to compile and analyse a database for analysis without confidentiality or IP risks. It would be beneficial if the database was subsequently available for use by the Clyde marine planners and other project partners, so this should be considered when seeking any research ethics approval.

We invite the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.



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Making the Most of Masters

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Name and address of Organisation: NatureScot Great Glen House, Leachkin Road, Inverness, IV3 8NW.
Name of the key contact in Organisation: Sarah Lawrence
Contact e-mail and phone number: Sarah.Lawrence@nature.scot , 01738 458820
Title of proposed project: Investigating potential light disturbance from cruise ships on petrels / shearwater and developing best practice guidance.
Project outline and intended outcomes: Light disturbance is a well-recognised pressure acting on petrels and shearwaters. Work is underway to consider this impact pathway with respect to offshore wind farm (OWF) development, but we are also aware that during the breeding season, cruise ships anchor off seabird islands overnight ahead of a land visit the following day. Ships remain fully lit up throughout the night and have the potential to disorientate petrels and shearwaters. The degree to which this is happening is not known and the level of impact poorly understood. This project would take an initial look at identifying scale of occurrence, impact, and making recommendations for best practice to avoid/reduce light disturbance.
Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?): The project could be desk based and may include engagement with relevant stakeholders and collating data on the behaviour of cruise ships during visits to seabird colony SPAs. Depending on the approach taken by the student there may be a need to use GIS. The project would suit a student with an interest in marine ornithology and presents an opportunity to help shape future management measures to protect petrel and shearwater populations at their breeding colonies. We invite the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.



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NatureScot
Great Glen House, Leachkin Road, Inverness, IV3 8NW.

Name of the key contact in Organisation:

Eunice Pinn

Contact e-mail and phone number:

eunice.pinn@nature.scot (01463 725216)

Title of proposed project:

Global Biodiversity Framework and the development of the GB Red List for Marine Mammals

Project outline and intended outcomes:

Marine mammals are a ubiquitous feature of almost every international conservation convention. Although not specifically mentioned, the Global Biodiversity Framework (GBF) is no different. For example through Target 4, Contracting Parties must '*Ensure urgent management actions, to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimize human-wildlife conflict for coexistence.*'

On 1 August 2024, the UK submitted the indicators against which our progress to implementing the GBF targets will be measured, with the first progress report due in January 2026. These indicators included an ongoing commitment to the Red List Index. Previously, through the Convention on Biological Diversity (CBD), the UK has been reporting against the Red List Index using the global level IUCN assessments rather than GB assessments. For GBF, however, it has been proposed that the UK will utilise GB level assessments. Currently there are no marine Red List assessments available at a GB level.

Red list assessments are objective and based on scientific information and ongoing research. This information can help make decisions about conserving biodiversity, but are not a list of conservation priorities per se. The aim of this project is to utilise existing assessments (e.g. those undertaken for the Scottish Marine Assessment 2020, the OSPAR Quality Status Report 2023 and the forthcoming Habitats Regulations reports) as a basis for producing GB Red List assessments for marine mammals, focusing on those species currently designated as Priority Marine Features in Scottish waters. In addition, the project will consider the potential for alignment across our various national and international reporting commitments for marine mammals, and how these might be streamlined for future assessments.

Useful References:

[Guidelines for using the Red List Categories and Criteria OSPAR Quality Status Assessments 2023](#)
[UK Habitats Directive Reports 2019](#)
[Scotland's Priority Marine Features](#)
[Review of Management Units for cetaceans in UK 2023](#)
[Reports from the Special Committee on Seals \(SCOS\)](#)
[Scotland's Marine Assessment 2020](#)

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

This project would suit a student with an interest in the interface between science and policy. Good critical evaluation skills will be required with a need to differentiate between evidence and opinion. There may also be a need to use statistics and/or GIS depending on the approach chosen by the student. This project is desk-based and can be carried out at the university with regular online supervisor meetings. It may be possible to arrange a visit to one of the NatureScot offices.

This project will involve working with Dr Eunice Pinn (Marine Indicators Advisor) at NatureScot and Roma Banga (Senior Marine Mammal Advisor) at the Joint Nature Conservation Committee (JNCC).



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Name and address of Organisation:

NatureScot
Great Glen House, Leachkin Road, Inverness, IV3 8NW.

Name of the key contact in Organisation: Katie Cubbon (Fair Isle Demonstration and Research MPA research officer)

Contact e-mail and phone number: katie.cubbon@nature.scot +44 1463 667613

Title of proposed project: Fair Isle Demonstration and Research MPA: investigation of Passive Acoustic Monitoring methodologies for cetacean monitoring around Fair Isle

Project outline and intended outcomes:

Cetaceans are important indicators of the state of the marine environment and have a key role in maintaining the health of marine ecosystems. They provide a range of ecosystem services: preserving balance within marine and coastal food chains; reducing CO₂ within our atmosphere; and boosting global economy. Understanding cetacean populations and distribution will help us to determine what impacts they face and what measures can be established to maintain and enhance their populations.

Cetacean monitoring is a priority research area within the [Fair Isle Demonstration and Research MPA programme](#). Cetacean monitoring surveys aim to gather information on the species presence and distribution within and around the Fair Isle DR MPA using visual observations obtained through Shorewatch surveys and ad-hoc community observations. Passive Acoustic Monitoring (PAM) methodologies will also be used to collect vocalisations to assess presence and absence of species. This click data will be analysed alongside visual sightings data in the long-term monitoring of cetaceans around Fair Isle.

This student will work with the Fair Isle Marine Research Organisation (FIMRO) to develop a cetacean monitoring programme for Fair Isle. This will also include refining deployment methodologies for PAM devices and investigating mooring designs which are suitable to withstand the challenging environmental conditions around the isle.

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

The student should have a good understanding of marine ecosystems and an interest in cetacean monitoring. There may be opportunity for the student to travel to Fair Isle to gain an understanding of the marine environment and carry out visual cetacean surveys (Shorewatch training can be provided).

This MSc provides the student with an exciting opportunity to lead on idea and method development and make recommendations to support long-term cetacean monitoring within the Fair Isle DR MPA. The student will be supported by the Fair Isle DR MPA research officer and the Fair Isle Marine Research Organisation.

We invite the student to visit our main office in Inverness to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.



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Name of the key contact in Organisation:

Eunice Pinn

Contact e-mail and phone number:

eunice.pinn@nature.scot (01463 725216)

Title of proposed project:

Development of an indicator for fishery sustainability

Project outline and intended outcomes:

The overall health of our marine environment is assessed at regular intervals, both nationally (e.g. [UK Marine Strategy Assessment 2019](#), the [Scottish Marine Assessment 2020](#) and the [State of Nature Scotland Report 2023](#)) and internationally (e.g. [Living Planet Report 2022](#) and the [OSPAR Quality Status Report 2023](#)). Such assessments consider the abundance and distributional trends of species including commercial fish stocks, as well as changes in the physical environment and the potential impacts of our activities.

The indicator used in such assessments for determining the sustainability of a fishery requires consideration of the spawning stock biomass and fisheries mortality. This indicates the health of the stock, and if both criteria are within expected thresholds, the fishery is considered sustainable. This approach takes no account of the fisheries impact on the wider environment (e.g. the bycatch of non-target species, some of which are also protected, or impacts on benthic habitats).

The aim of this project is to explore ways in which the current fisheries sustainability indicator can be combined with biodiversity indicators (e.g. those for determining Good Environmental Status or the Favourable Conservation Status of protected species) to develop a relatively simple metric for improving the determination of the ecological sustainability of Scotland's fisheries.

Useful References:

Anderson et al (2015) The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes. PLoS ONE 10(5), e0122809.
<https://doi.org/10.1371/journal.pone.0122809>.

Bentley et al (2021). Refining fisheries advice with stock-specific ecosystem information. Front. Mar. Sci. 8: 602072. <https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2021.602072/full>

Eggert et al (2021). Assessing global fisheries using Fisheries Performance Indicators: Introduction to special section. *Marine Policy*, 125, 104253.
<https://doi.org/10.1016/j.marpol.2020.104253>.

Kell et al (2024). Developing management plans for sprat (*Sprattus sprattus*) in the Celtic Sea to advance the ecosystem approach to fisheries. *Canadian Journal of Fisheries and Aquatic Sciences*, 81(8), 1104-1121. <https://doi.org/10.1139/cjfas-2023-0090>

Marengo et al (2023). Combining indicator trends to evaluate a typical Mediterranean small-scale fishery: The case study of Corsica. *Regional Studies in Marine Science*, 65, 103087. <https://doi.org/10.1016/j.rsma.2023.103087>.

Zhou et al (2016). Ecological risk assessments for the effects of fishing: A comparison and validation of PSA and SAFE. *Fisheries Research*, 183, 518-529.
<https://doi.org/10.1016/j.fishres.2016.07.015>

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We invite the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.

This project will involve working with Dr Eunice Pinn (Marine Indicators Advisor) and Dr David Donnan (Marine Sustainability Manager – Marine Fisheries) at NatureScot.



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Name of the key contact in Organisation: Katie Cubbon (Fair Isle Demonstration and Research MPA research officer)
Contact e-mail and phone number: katie.cubbon@nature.scot +44 1463 667613
Title of proposed project: Fair Isle Demonstration and Research MPA baseline plankton survey analysis
Project outline and intended outcomes: <p>Ocean plankton plays a fundamental role in maintaining the health and structure of the marine environment. Phytoplankton in particular plays a key role in ocean cycles and supports a substantial portion of marine life including; zooplankton and vulnerable larval cycles.</p> <p>Phytoplankton is globally important in that it contributes significantly to the global carbon cycle. The biological carbon pump is responsible for transporting particles of carbon from the ocean surface to ocean sediment. Physiology and structure of phytoplankton communities determine the efficacy of this atmospheric carbon transfer. Increased knowledge on the structure, processes and impacts on phytoplankton is vital in understanding their role as a source of organic carbon.</p> <p>Significant changes of plankton structures have been noted to cause reduced survival rate of marine species. Of particular concern, is the impact of climate change on the synchrony between phytoplankton blooms and higher trophic levels. Variation in bloom initiation encompasses all levels of marine food webs, including the reduction of prey availability during critical breeding periods of top predators.</p> <p>Plankton monitoring is a priority research area within the Fair Isle Demonstration and Research MPA programme. This project aims to utilise existing data streams from the Continuous Plankton Recorder Survey to build a picture of current plankton function and activity around Fair Isle. This analysis will help to generate baseline knowledge of phytoplankton and zooplankton; species presence, distribution and abundance, and assess organic carbon potential around Fair Isle.</p> <p>The student will work with the Fair Isle Marine Research Organisation and the Fair Isle DR MPA research officer to develop specific research objectives and appropriate statistical analyses for this project.</p>

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

This project will involve statistical analysis so the student should have experience and an interest in statistical methodologies. CPR data is available for the period 1958-2022 from plankton trawls taken from the MV Hildasay which travels between Shetland and Aberdeen on a regular basis. There is also a wealth of climate data available for Fair Isle including sea surface temperature (SST) data which could be incorporated into analyses to investigate climatic patterns in plankton abundance.

As this project is still under development, this gives the student the opportunity to lead on ideas for statistical analyses as well as the development of specific research objectives for the project. The student will be supported by the Fair Isle DR MPA research officer and the Fair Isle Marine Research Organisation.

This MSc project is fully desk-based; however, we invite the student to visit the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.



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Name of the key contact in Organisation: Kelly James
Contact e-mail and phone number: Kelly.James@nature.scot , 01313146763
Title of proposed project: Assessing the resilience of Scotland's MPA network to climate change.
Project outline and intended outcomes: <p>Climate change will have a profound effect on global marine environments, with business-as-usual emission scenarios projecting temperature increases of 4.3°C above pre-industrial levels, pH decreases of 0.31–0.35 and increasingly frequent extreme weather events by 2100. Such changes will have significant impacts to marine ecosystems, for example, by causing changes in species composition and disrupting trophic pathways.</p> <p>Scotland's Marine Protected Area (MPA) network covers 37% of Scotland's seas, hosting a range of species and habitats. The current MPA has been designed with current species and habitats distributions in mind with site-specific conservation objectives aiming to keep species and habitats at, or bring them to, favourable condition. The resilience of the current MPA network to climate change has not been assessed and it is not known if climate change will impact our ability to meet MPAs conservation objectives. A better understanding of this resilience is crucial for a strategic, rather than reactive, response to climate change.</p> <p>This MSc project aims to assess the resilience of Scotland's MPA network to climate change. We envision that the student will first trial different methods for assessing resilience, focusing on a specific MPA. The student may then wish to assess several MPAs and may wish to focus on a specific region (i.e., West Coast or North Sea) or compare MPAs in different regions that host similar species and habitats. Different IPCC scenarios may wish to be explored. As part of an initial literature review, the student may wish to explore how the resilience of MPA networks is being assessed in other countries. Along with the assessment, intended outcomes should include recommendations how to integrate climate change in Scotland's MPA network design.</p>

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

The student should have a good understanding of climate change and Scotland's marine environment. We have already carried out a review of the impact of climate change on several benthic features, and therefore the focus of this project would be using this review to assess climate change resilience. A review of the effects of climate change on mobile species may be required if the student wishes to investigate mobile species in the assessment.

GIS skills are required, although training may be available if the student does not have experience in this. The project may involve statical analysis, although this is at the students discretion. The MSc is desk based and can be carried out at the University.

We invite the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.



PROJECT PROPOSAL FORM

Making the Most of Masters aims to improve collaboration between employers and universities by providing opportunities for postgraduate students to undertake work based projects as an alternative to a traditional university dissertation. Projects should address a real need within the host organisation and be beneficial to both host and student.

The Marine Alliance for Science and Technology for Scotland (MASTS), pools the majority of Scotland's marine research capacity. MASTS members provide Masters courses in a range of marine related disciplines and many of their students are keen to undertake applied projects outside of academia.

Notes on Topic Selection

A relevant academic will work with your organisation to refine your proposed topic and ensure it meets both your needs and the academic requirements of the student. Projects should typically be achievable within a 12–16 week timeframe (including writing the final report).

Your proposed project could be:

- A specific project title or topic for the student to deliver;
- A general idea of a business need which requires further development;
- A core research theme to be developed by the student into a bespoke project;
- An intended outcome for the organisation.

The level of detail you provide will determine the extent to which further discussion may be required with the relevant programme director to ensure suitability.

desk-based/data studies that will easily facilitate remote working and remote supervision are welcome, as well as in person and/or experimental based projects where appropriate.

What's Next?

Please send your completed form to the MASTS Programme Coordinator & Deputy Dean of Grad School, Dr Emma Defew (masts@st-andrews.ac.uk) before the deadline.

Following submission of the form, it will be channeled to the leaders of the various Masters programmes that operate within the MASTS community and a representative from the most relevant programme or department will get in touch to discuss the project scope, delivery and the selection of an appropriate student. If more than one student expresses an interest in your project, you will need to ensure discussions take place to enable the most suitable student to be matched with your project. The projects themselves usually won't start until May or June.



MASTS - Making the Most of Masters – Project Proposal Form

Name and address of Organisation:

NatureScot
Great Glen House, Leachkin Road, Inverness, IV3 8NW.

Name of the key contact in Organisation:

Sarah Lawrence

Contact e-mail and phone number:

Sarah.Lawrence@nature.scot, 01738 458820

Title of proposed project:

Rum Manx shearwaters - exploring drivers of population dynamics to inform conservation management

Project outline and intended outcomes:

The Manx shearwater colony on the island of Rum is globally important, holding some 30% of world population. The drivers of population size and trends for this population are complex and include both intrinsic and extrinsic factors operating within the colony and in the birds' marine range, which includes wintering and prebreeding areas in the western Atlantic. At the colony, factors influencing breeding success include flooding of nest burrows during heavy rainfall and depredation of eggs or chicks by brown rats. Levels of rat activity at the colony may also be affected by climatic factors (e.g. winter temperatures). The development of large offshore wind farms (OWF) within the birds' foraging ranges may also impact birds from this population. A Bayesian state-space model of the colony population dynamics has recently been developed by Jason Matthiopoulos (under a ScotMer <https://www.gov.scot/policies/marine-renewable-energy/science-and-research/contract>).

The aim of this MSc project would be:

- a) to use the model framework to further explore how proximate factors, in particular rainfall patterns at the colony during the breeding season, may influence colony dynamics. Technically, this task can be thought of as an apportioning of the empirically inferred dispersion (the random effects), into the contributions of covariates.
- b) to use the model framework to explore potential population outcomes under various scenarios of future change, including pulse and press perturbations (potentially operating in tandem) to key demographic parameters.

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

The project would be desk-based; the student should have a good understanding of statistical analysis and should be proficient in the use of statistical programs including R. The fully-fitted, user-friendly and computationally efficient R-functions developed for this model will be available to the project. The project would suit a student with an interest in marine ornithology, statistics and population modelling.

We invite the student to visit a NatureScot office to meet with relevant colleagues as well as other MSc students carrying out projects within NatureScot. Travel and subsistence may be covered for this journey.