



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:

Ruth Paterson, Marine Data Adviser (marine MSc coordinator)
Ben James, Head of Marine Science
Brodie Thomas, Marine Enhancement Adviser

Contact e-mail and phone number:

Ruth.paterson@nature.scot 01738 458542
Ben.james@nature.scot 01463 725235
brodie.thomas@nature.scot 01463 701643

Title of proposed project: Investigating the decline of Seagrass in Loch Fleet

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?):

Background

The seagrass beds in Loch fleet SSSI have experienced significant decline. Some evidence suggests that water quality, management and climate change could be the contributors to the decline, but more evidence is needed to understand this loss.

Description of proposed research (max 250 words)

Provide a description of the project including:

Aim of the project

Investigating the decline of Seagrass in Loch Fleet, with a focus on water quality. Methodology

needed to investigate this would need to be discussed and agreed.

Whether it is a desk-based piece of research or includes field research or both.

Both

Location if fieldwork required.

Loch Fleet

What information/data NatureScot will provide

Contacts, and use of hire cars that NatureScot could assist with (if necessary)

Desired outputs

Further information on Seagrass declines so management can be implemented.



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Title of proposed project: Reviewing biosecurity protocols for Native Oyster and/or Seagrass restoration

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?):

Background

Biosecurity is a key consideration when introducing species to a location during restoration projects e.g., native oysters, seagrass. There are recognised processes to minimise introduction of disease and Invasive Non-Native Species (INNS) that can be mixed in or attached to the species being introduced. It is normal practice to produce a biosecurity plan, but communities are finding the practice hard to carry out as it is time-consuming, and labour-intensive. There are requests to investigate whether alternative methods can be used that are more manageable within the community/volunteer sector but still have the required level of biosecurity.

Description of proposed research (max 250 words)

Provide a description of the project including:

- Aim of the project
 1. Review current biosecurity protocols that have been produced
 2. Assessment of these methods i.e. pros, cons, issues – this could include interviews/surveys with communities carrying out restoration.

3. *Review of alternatives e.g. different methods, chemicals, technology (e.g. eDNA and mechanisation)*

4. *Recommendations on ways forward*

- *Whether it is a desk-based piece of research or includes field research or both.*

Could potentially be both but this would need to be discussed with the student. We would need to tease out what the field research element would be some ideas include interviewing community groups who are carrying out restoration.

- *Location if fieldwork required.*

TBC but would include active restoration sites around Scotland.

- *what information/data NatureScot will provide*

Contacts, current biosecurity plans, and use of NatureScot cars (if necessary)

- *desired outputs*

Review of current biosecurity protocols, with clear recommendations on ways forward, particularly for community groups who do not have the resources to carry out 'gold standard' biosecurity.

Project timescale limitations

Does the project have to happen at a particular time of year as Masters Projects happen at different times of the year?

Native oyster biosecurity is not usually done in the summer due to stress-related mortalities, but opportunities may still be available to get some first-hand experience.

Intellectual Property or confidentiality issues

We would need to confirm with projects that biosecurity plans can be used in research etc.



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Title of proposed project:

Sustainable Fisheries Indicator Development

Project outline and intended outcomes:

In addition to the stock removed, fisheries sustainability also needs to take account of impacts on the wider environment (e.g. the bycatch of non-target species, some of which are also protected, as well as impacts on benthic habitats). Although there are a variety of approaches that take these considerations into account (e.g. the Marine Stewardship Council Fisheries Standard or Seafish's Ecological Risk Assessment of the South West), we do not have an indicator that combines stock assessment, fishing effort and biodiversity for assessing the sustainability of Scotland's fisheries. The aim of this project is to explore ways in which ICES stock assessments can be combined with biodiversity indicators (e.g. those for determining Good Environmental Status or Favourable Conservation Status) in order to develop an indicator for sustainable fishing.

Project Advisors:

Eunice Pinn, Marine Indicators Adviser
David Donnan, Marine Sustainability Manager

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?):

Anticipated to be computer-based using the student's own computer/ university IT facilities and mostly external data sources.



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Title of proposed project:

Ornithology Projects (only capacity to run one of the below proposals)

Project outline and intended outcomes:

Title: Investigating potential light disturbance from cruise ships on petrels/ shearwater and developing best practice guidance.

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 shearwaters/petrels. 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.

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

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 pre-breeding 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

Advisor:

Emma Phillip, Marine Protected Areas and Ornithology Manager

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?):

Anticipated that the student will require onboarding to NatureScot systems. This will require a 1-2 month lead-time for disclosure and other requirements.