MASTS - Making the Most of Masters – Project Proposal Form

Name and address of Organisation:
Environmental Standards Scotland
Thistle House
91 Haymarket Terrace
Edinburgh
EH12 5HD

Name of the key contact in Organisation:

Kirsty Macleod

Contact e-mail and phone number:
Kirsty.macleod@environmentalstandards.scot

Title of proposed project:

Governance of anthropogenic noise in Scotland's marine environment

Project outline and intended outcomes:
Environmental Standards Scotland (ESS) is an independent body set up in October 2021 to ensure compliance with, and to improve the effectiveness of, environmental law, and to prevent enforcement gaps arising in Scotland following the UK's departure from the European Union. One of ESS' key analytical priorities is to develop a better understanding of threats to the marine environment.

Anthropogenic noise in the marine environment has been recognised as a longstanding pressure impacting marine organisms, in particular marine mammals. Following engagement with marine stakeholders, ESS concluded that anthropogenic noise is a persistent issue in Scotland's marine environment and many data gaps (particularly for offshore waters) remain, limiting the ability to assess its full ecological impact, particularly population-level impacts for marine mammal species. Such uncertainties are of particular importance given the anticipated increase in offshore wind development to reach the Scottish Governments 11 GW production by 2030, and anticipated shipping increases to accommodate demands in supply chains – both of which are major sources of underwater noise.

The Scottish Marine Assessment 2020 highlighted the development of new methods to monitor marine noise and knowledge gaps surrounding impulsive noise (pulsed sounds associated with pile driving, acoustic surveys etc.), while stating that no defined assessment criteria exist for continuous anthropogenic noise.

In terms of project methodology, I envisage this project being a review-based methodology examining governance, policy and legislation surrounding marine anthropogenic noise. Specifically, this project could aim to provide greater understanding into the following topic(s):

- how underwater noise is assessed, and the assessment criteria for pulsed and continuous noise
- the licensing and regulation of marine spatial planning in relation to activities that produce underwater noise, and which activities are regulated
- Methodology currently used to mitigate marine mammals against anthropogenic noise, and their effectiveness
- Research detailing any long-term ecological impacts of underwater noise on marine mammals

Alternatively, publicly available data relevant to Scotland's water from the Marine Noise Registry, a database that records the spatial and temporal distribution of loud, low to medium frequency (10Hz – 10kHz) impulsive noise generating activities in UK seas, could be analysed as part of the review. However, given the extensive experience at relevant MASTS institutions in investigating the impact of anthropogenic noise on cetaceans, there could be potential for a more data-focused project to be developed by the MASTS host that incorporates underwater noise and its impacts on cetaceans, if it fits the remit of the ESS' aims, and better suits/qualifies for an MSc project.

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?):

ESS' overall aim is to better understand possible threats to the marine environment, and therefore any output from the proposed project will be of great interest to ESS. However, due to our limited resources, we envisage the university host acting as the main contact of support for the student, where the project will primarily take place and the named supporting organisation for any outputs of the project. ESS are happy to conduct an introductory meeting with the student at the start of the project, and facilitate data gathering prior to the project (if needed). We also offer to host the prospective student on a day visit to the ESS office in Edinburgh if they wish to know more about the organisation and working in civil service.

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Name of the key contact in Organisation: Kirsty Macleod
Contact e-mail and phone number: Kirsty.macleod@environmentalstandards.scot
Title of proposed project: Investigating fisheries bycatch as a pressure for Scotland's seabirds
Project outline and intended outcomes: Environmental Standards Scotland (ESS) is an independent body set up in October 2021 to ensure compliance with, and to improve the effectiveness of, environmental law, and to prevent enforcement gaps arising in Scotland following the UK's departure from the European Union. One of ESS' key analytical priorities is to develop a better understanding of threats to the marine environment. As part of this, ESS conducted a systematic scoping process, involving engagement with relevant stakeholders, which highlighted a need for ESS to monitor and better understand fisheries bycatch of seabirds, and its possible role in seabird decline. Bycatch is one of the most significant threats globally to the conservation and welfare of marine species and is considered one of the main pressures impacting Scotland's seabird, cetacean and seals species. Through the Fisheries Act 2020, the Scottish Government recognises the need to minimise and, where possible, eliminate bycatch of sensitive marine species as part of a wider effort to ensure the sustainability of Scotland's fisheries. Acknowledging the threat of bycatch and the complexities surrounding bycatch, in 2022 the UK Government set out the marine wildlife bycatch mitigation initiative outlining proposed measures to eliminate bycatch, including improving knowledge of bycatch and identifying bycatch "hotspots". For seabirds, the State of Nature report highlighted a 49% decline in seabird abundance since 1986; for Scotland there has been a decrease in breeding seabird abundance since 1986. Seabirds did not achieve Good Environmental Status (GES) in the latest assessment and numbers are expected to further decrease with the growing threat of Highly Pathogenic Avian Influenza. Multiple threats are suggested to be driving seabird decline (climate change, changing prey abundance, bycatch,

offshore wind infrastructure). This project proposes focusing on the role of seabird bycatch (depicted by the likely data available) to assess its possible role in seabird decline in Scotland.

The approach for this project would ideally use available data from long-term bycatch monitoring programmes, such as the ICES Bycatch database, the Scottish entanglement alliance, the UK bycatch Monitoring Programme (SMRU), SMASS stranding data, alongside possible access to ICES / Marine Scotland fishing effort data, to assess the extent / trends in seabird bycatch in Scotland's waters (inshore and offshore where applicable). This project may also have scope for assessing the efficacy of fishery bycatch mitigation methods (such as ADDs, visual scarers and long line sinking strategies and) in reducing sea bird bycatch, if such primary data is recorded/available through one of the MASTS institutions.

Alternatively, if sufficient data is not available / not accessible, a review-based project could be developed that will assist in giving ESS a better understanding of the following topic(s):

- Current policy and legislation surrounding fishery bycatch in Scotland
- Current known assessment of seabird bycatch in Scotland, e.g. species prevalence, hotspots, and how this is monitored
- Current research into / development of seabird bycatch mitigation measures
- Research examining the wider / long-term ecological impacts of seabird bycatch on species populations
- Data gaps surrounding seabird bycatch, e.g. Scottish hotspots, most detrimental fishing gear types.

Recent government-led projects examining seabird bycatch specifically across Scotland, the UK and more widely, will likely be helpful alternative resources to review if primary data is unavailable. Links to reports: JNCC seabird bycatch mitigation evidence assessment and seabird bycatch in Scottish longline fisheries and exploring potential solutions report and ICES bycatch of endangered species working group, who publish annual reports on bycatch data analysis – see:
https://doi.org/10.17895/ices.pub.21602322.v1
https://doi.org/10.17895/ices.pub.9256
https://doi.org/10.17895/ices.pub.7471
https://doi.org/10.17895/ices.pub.5563
https://doi.org/10.17895/ices.pub.19290758.v2

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?):

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Name of the key contact in Organisation: Kirsty Macleod
Contact e-mail and phone number: Kirsty.macleod@environmentalstandards.scot
Title of proposed project: Investigating harbour seal decline in Scotland's waters
Project outline and intended outcomes: Environmental Standards Scotland (ESS) is an independent body set up in October 2021 to ensure compliance with, and to improve the effectiveness of, environmental law, and to prevent enforcement gaps arising in Scotland following the UK's departure from the European Union. One of ESS' key analytical priorities is to develop a better understanding of threats to the marine environment. As part of this, ESS conducted a systematic scoping process, involving engagement with relevant stakeholders, which highlighted a need for ESS to monitor and better understand the population declines in harbour seals across Scottish waters. The Marine (Scotland) Act 2010 is the main legislation protecting seals in Scottish waters, making it an offence to intentionally or recklessly kill, injure or take a sea unless to alleviate suffering or where a license has been permitted by Marine Scotland. This Act has also seen the designation of five Seal conservation Areas in Scotland, the designation of eight SACs designations specifically for harbour seals under the EU Habitats Directive of which seals are listed under Annex II. In addition, it is an offence to intentionally or recklessly harass seals at any of the 194 haul-out sites that have been designated around the Scottish coast, of which 62 are used mainly by harbour seals and 67 shared by harbour and grey seals. The Scottish Marine Assessment 2020 highlighted that harbour seals have not yet reached GES for the greater North Sea, OSPAR latest report revealed lack of data prevents the assessment of GES for harbour seals in the Greater North Sea, whilst the recent State of Nature report highlighted that populations along the north and east coasts of Scotland are ~40% below pre-2002 levels before phocine distemper virus wiped out populations.

This project could aim to investigate and summarise the major pressures likely driving harbour seal population decline across Scotland. The student could work in collaboration with SMRU, the marine mammal scientific support to the Scottish Government, who provide annual analysis on such matters, or they could provide a specific dataset for the student to analyse/reanalyse. Dependent upon available data, the student could analyse a specific pressure more closely, such as the examining trends of seal entanglement/bycatch with fishing gear (e.g. using ICES data) to gain greater insight into its relevance as a pressure that may be driving population declines.

In addition, this project could also aim to provide a review of:

- Scottish legislation / policy specific to harbour seals, such as the Conservation of Seals Act 1970, Conservation of Seal (Scotland) Order 2004 and 2007, and the Marine (Scotland) Act 2010.
- How such legislation is enforced / regulated and the potential barriers to these regulatory mechanisms.

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?):

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Title of proposed project:

Investigating bycatch and entanglement as a pressure for Scotland's cetaceans

Project outline and intended outcomes:
Environmental Standards Scotland (ESS) is an independent body set up in October 2021 to ensure compliance with, and to improve the effectiveness of, environmental law, and to prevent enforcement gaps arising in Scotland following the UK's departure from the European Union. One of ESS' key analytical priorities is to develop a better understanding of threats to the marine environment. As part of this, ESS conducted a systematic scoping process, involving engagement with relevant stakeholders, which highlighted a need for ESS to monitor and better understand fisheries bycatch of marine mammals.

Bycatch is one of the most significant threats globally to the conservation and welfare of marine species and is considered one of the main pressures impacting Scotland's cetacean species, which are legally protected under the Habitats Directive. Through the Fisheries Act 2020, the Scottish Government recognises the need to minimise and, where possible, eliminate bycatch of sensitive marine species as part of a wider effort to ensure the sustainability of Scotland's fisheries. Acknowledging the threat of bycatch and the complexities surrounding bycatch, in 2022 the UK Government set out the marine wildlife bycatch mitigation initiative outlining proposed measures to eliminate bycatch, including improving knowledge of bycatch and identifying bycatch "hotspots".

The approach for this project would ideally use available data from long-term bycatch monitoring programmes, such as the Scottish entanglement alliance, the UK bycatch Monitoring Programme (SMRU), SMASS stranding data, alongside possible access to ICES / Marine Scotland fishing effort data, to assess the extent / trends in cetacean bycatch in Scotland's waters (inshore and offshore where

applicable). ICES data on bycatch is not publicly available, however data could be pulled from the ICES working group on bycatch of endangered species who report annually on bycatch data across the ICES areas. See:
https://doi.org/10.17895/ices.pub.21602322.v1
https://doi.org/10.17895/ices.pub.9256
https://doi.org/10.17895/ices.pub.7471
https://doi.org/10.17895/ices.pub.5563
https://doi.org/10.17895/ices.pub.19290758.v2

Specific questions could focus on identifying focus areas or 'hotspots' of bycatch for Scotland's cetacean species (depicted by the data available) and where regulation/legislation effectiveness could be assessed. This project may also have scope for assessing the efficacy of fishery bycatch mitigation methods (such as ADDs, visual scarers and long line sinking strategies and) in reducing cetacean bycatch, if that data is recorded/available through one of the MASTS institutions.

Alternatively, if sufficient data is not available / not accessible, a review-based project could be developed that will assist in giving ESS a better understanding of the following topic(s):

- Current policy and legislation surrounding fishery bycatch of cetaceans in Scotland.
- Current regulatory mechanisms used to enforce such policies / legislation
- How is cetacean bycatch currently monitored in Scotland, where are the data gaps?
- Current research into / development of cetacean bycatch mitigation measures.
- Research examining the wider / long-term ecological impacts on cetacean populations.

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?):

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