



## PROJECT PROPOSAL FORM

Making the Most of Masters aims to improve collaboration between employers and universities by providing opportunities for masters 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.

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### 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](mailto:masts@st-andrews.ac.uk)) before **16:00 on Tuesday 20<sup>th</sup> November 2018**.

Following submission of the form, it will be channelled 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, discussions will take place to ensure the most suitable student is matched with your project. It is expected that students will be assigned to projects before the end of February, although 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:**

Tentsmuir National Nature Reserve

**Name of the key contact in Organisation:**

Tom Cunningham | Reserve Manager for Tentsmuir National Nature Reserve

**Contact e-mail and phone number:**

[tom.cunningham@nature.scot](mailto:tom.cunningham@nature.scot) or Tel 01738 458818

**Title of proposed project:**

Various projects available

**Project outline and intended outcomes:**

Tentsmuir Point & Abertay Sands are a major part of the NNR.

I am sure there are and there will be many possible research projects for a Masters student to carry out on here.

I would like to see what impact visitors have on the wildlife especially the marine mammals on Tentsmuir Point.

Also what can be done to prevent or dissuade visitors to walk out onto the sandbars when it is low tide and disturb the grey seals and if there are any on site the harbour seals.

What impact are visitors having on the breeding seals? What can we do to prevent the visitor impact.

Where did the Harbour seals go and why?

And of course I am open to research suggestions

**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 and address of Organisation:**

James Hutton Institute, Craigiebuckler, Aberdeen AB158QH

**Name of the key contact in Organisation:**

Lisa Avery

**Contact e-mail and phone number:**

[Lisa.avery@hutton.ac.uk](mailto:Lisa.avery@hutton.ac.uk) / 07981700933

**Title of proposed project:**

Comparison of sediment vs. water sampling of faecal indicator organisms

**Project outline and intended outcomes:**

Bathing waters are traditionally sampled (by SEPA or other relevant environmental agencies in other parts of the world) to determine the number of faecal indicator organisms and therefore the status of the bathing water in terms of risk to human health from bathing. However, water column samples vary greatly depending on weather conditions and catchment events leading to pathogen loading. A number of researchers have proposed that analysing sediment samples may provide a more stable assessment of faecal indicator organisms in bathing waters.

This project would seek to carry out a direct comparison of sediment vs. water column samples at contrasting bathing water sampling sites in Scotland. This would be an entirely self-contained project which the student would have the option to help design, undertake and write up.

There would also be the opportunity to undertake DNA extraction from waters and sediments with a view to applying molecular markers for microbial source tracking or detection of pathogen DNA.

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Methods would include either Idexx Colilert MPN detection of E. coli/total coliforms or filtration and use of selective agar, DNA extraction kits, Q-PCR, water sampling. This project would suit a microbiologist/biologist or someone with an interest in water quality.

The work would probably take place at the James Hutton Institute, however it may be possible to be flexible about this depending on sampling sites, availability of supervision and facilities at the university.

The ideal outcome would be a short publication from this work with shared IP between the university and the James Hutton Institute.



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## MASTS - Making the Most of Masters – Project Proposal Form

**Name and address of Organisation:**

Deveron, Bogie & Isla Rivers Charitable Trust (DBIRCT)

**Name of the key contact in Organisation:**

Al Reeve

**Contact e-mail and phone number:**

alreeve@deveron.org

**Title of proposed project:**

Measuring the mink menace

**Project outline and intended outcomes:**

The American mink (*Neovison vison*) is a non-native and invasive semi-aquatic mammal, which occupies both freshwater and saltwater habitats and follows waterways, lake edges and coasts. Being an opportunistic predator, often killing more than they require for food, mink have had a devastating effect on British native wildlife - in particular ground nesting birds and water vole.

After nearly 15 years of mink control in Northeast Scotland, mink numbers on main rivers have declined considerably however there remains high numbers in coastal areas.

We would like to know what is the effect of mink populations in coastal areas, particularly with regards to any/all of the following:

What are mink foraging on – aquatic species, intertidal organisms or birds?  
Are they having an impact on ground/cliff nesting birds? – there are anecdotal reports of cliff-nesting birds declining as mink become more frequent  
Does their diet change over the year?

How much of the mink's diet consists of fish (river vs coastal populations) – are mink having a significant effect on the numbers of salmon/trout in the river or the success of salmon smolts making it out to sea?

This information would feed into the ongoing management of mink as well as feeding into conservation efforts for birds and salmonids.

**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 is quite an open-ended project and could be approached in multiple ways (or split into multiple projects).

Staff at the DBIRCT actively trap mink and so scats can be collected and stomach contents are easily accessible from the dispatched mink. This can be analysed by identifying remains or through chemical investigations.

The travel requirements would be limited for this project, DBIRCT could collect mink and arrange for them to be sent to the host institution for analysis.

Investigation into the success of chicks successfully fledging would require nest surveys (using binoculars) at known coast mink strongholds. This would require much more time and travel.



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Deveron, Bogie & Isla Rivers Charitable Trust (DBIRCT)

**Name of the key contact in Organisation:**

Al Reeve

**Contact e-mail and phone number:**

alreeve@deveron.org

**Title of proposed project:**

Mink, otters and water voles – conservation through indirect competition  
(literature review and interviews)

**Project outline and intended outcomes:**

The American mink (*Neovison vison*) is a non-native and invasive semi-aquatic mammal, which occupies both freshwater and saltwater habitats and follows waterways, lake edges and coasts. Being an opportunistic predator, often killing more than they require for food, mink have had a devastating effect on British native wildlife - in particular ground nesting birds and water vole.

There is some evidence to suggest that as otter populations increase mink are forced out of better habitat to marginal areas through indirect competition for resources.

We would like to know if this is demonstrably true. Also, what mink control projects/activities have been successful? What can we learn from them? Have voles started to return after a concerted period of mink trapping?

There has been a number of studies looking at the effect of mink control around the UK and there is a sizeable dataset of mink capture information as a result of ongoing mink control in Northeast Scotland (an agreement on access and acknowledgment will need to be put in place with the lead academic before this project starts).

Furthermore there are a number of bailiffs and biosecurity officers within the Rivers Trusts who have a great deal of anecdotal evidence of mink control and also otter presence in their patch, these folk could be interviewed to gain an insight into the interaction between them.

This project would provide details of best practice for controlling mink and inform on whether the return of native biodiversity is contributing to the decline in mink 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?):**

This project would be largely a desk-based literature review augmented by interviews with the lead scientists and people controlling mink in Rivers Trusts in Scotland. As a lot of this work has been done through a small number of academics, if we are to proceed with this project they would need to be approached at the outset to help shape the project and also ensure that they are acknowledged appropriately.

Skills developing interview questions which could then be collated and analysed would be very important.



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**Name and address of Organisation:**

Deveron, Bogie & Isla Rivers Charitable Trust (DBIRCT)

**Name of the key contact in Organisation:**

Marcus Walters

**Contact e-mail and phone number:**

marcuswalters@deveron.org

**Title of proposed project:**

Environmental drivers of salmon smolt migration (literature review and data analysis)

**Project outline and intended outcomes:**

Each year the DBIRCT places two smolt (rotary screw) traps in the upper reaches of the Deveron to count the number of salmon and trout smolts and parr migrating down the river. The traps are run continuously from March until April and all trout and salmon are recorded on a daily basis. The trap data shows clear patterns in migration as salmon and trout juveniles begin migrating downstream from their upstream nursery habitat. Although similar from year to year the patterns in migration vary by species, and life stage.

We have 4 years' (2014-2018) worth of trap data from the Allt Deveron and Blackwater tributaries and it would be good to know which (combination of) environmental variables drive the timing of the salmon smolt and trout migration downstream. Data is available on water level and water temperature but other drivers could be investigated (day length, phase of the moon, air temperature, lunar brightness etc.).

Understanding what causes the mass movements of smolts downstream would help to predict when smolts will begin their migration. This will help when coordinating management practices to maximise the number of smolts reaching the sea.

**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?):**

Four years of capture data has already been gathered and so all of the data is in place for an entirely desk-based project.

We will also be running the smolt traps again in 2019 and so a student could spend time gathering 'real-time' data if they wanted to include a field based component of their work (would require considerable travel and subsistence costs).



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**Name and address of Organisation:**

Joint Nature Conservation Committee  
Monkstone House  
City Road  
Peterborough  
PE1 1JY

**Name of the key contact in Organisation:**

Laura Robson

**Contact e-mail and phone number:**

[Laura.robson@jncc.gov.uk](mailto:Laura.robson@jncc.gov.uk)  
01733 866929

**Title of proposed project:**

Understanding the distribution and potential effects of seafloor litter in the UK's offshore marine environment

**Project outline and intended outcomes:**

Marine litter pollution is a global problem, with debris commonly found on beaches, the sea surface and seafloor, including the deep sea. The effects on marine species such as seabirds are becoming more well-known, with impacts including entanglement, suffocation and starvation due to litter ingestion. Furthermore, litter is known to damage and smother marine habitats such as coral reefs, and new studies have found that microplastics are ingested by a range of marine biota from benthic macroinvertebrates to larger marine mammals, with potential toxic effects.

Defra's 25-year environment plan states that the UK is committed to leading efforts to protect the marine environment and to tackle marine pollution through a sustainable, international and transboundary approach that prioritises reducing global reliance on plastics. To support these goals, we need clearer understanding of where marine litter occurs across UK waters and where it may have the greatest impact on marine ecosystems.

JNCC is the public body that advises the UK government and devolved administrations on UK-wide and international nature conservation, playing a key role in the UK's offshore (>12 nautical miles) marine environment. JNCC is responsible for identifying and providing conservation advice on Marine Protected Areas (MPAs) in UK offshore waters and for monitoring and assessing the status and condition of marine habitats and species under various legislative drivers

(e.g. EC Habitats Directive, MSFD) within, and outside of, MPAs. To deliver against these drivers we need to know more about the effects of anthropogenically-induced pressures, including marine litter. Whilst a range of studies are being conducted in UK coastal waters, the effect of litter in the offshore region is relatively under-studied. As such, this project will focus on developing knowledge of seafloor litter distribution and impact in the UK offshore.

JNCC commission and collaborate on research surveys to offshore MPAs, collecting data on benthic habitats and species using a range of survey techniques. Seabed imagery (video and stills) is frequently collected, alongside sediment samples. The presence of marine litter is recorded during seabed imagery analysis post-survey, but these data have not yet been used for any specific projects. As part of the OSPAR intermediate assessment 2017 (IA2017), marine litter data from trawl surveys, recorded in the ICES Database of Trawl Surveys (DATRAS), have been used to map the distribution and abundance of seafloor litter across the Greater North Sea, Celtic Seas and the Eastern Bay of Biscay. Results show that seafloor litter is widespread across the areas assessed, with plastic being the predominant material encountered.

This project will utilise existing seabed imagery data and the OSPAR seafloor litter distribution map, together with biological and physical oceanographic datasets to identify, 1) potential hotspots of seafloor litter in UK offshore waters, 2) the likely drivers of litter distribution, and 3) possible effects on offshore marine habitats.

The student will compile analysed seabed imagery data collected from offshore surveys and categorise it according to the litter categories from the OSPAR/ICES/International Bottom Trawl surveys. This dataset will be used to map the location and types of marine litter in offshore waters, using Geographic Information System software such as ArcGIS or QGIS. This will be combined with the OSPAR seafloor litter map (available from the OSPAR ODIMS website), to identify hotspots and potential trends in marine litter distribution in UK offshore waters, including within MPAs and across UK regional seas.

The project will further review existing literature (from scientific research and policy papers) on the environmental parameters that can influence the distribution of seafloor litter, and the potential effects of litter on marine benthic habitats. This information will be used to select relevant oceanographic datasets to apply to the distribution map, together with marine habitat maps (developed and provided by JNCC), to determine which environmental parameters may be driving litter distribution and which UK offshore marine habitats may be most at risk from marine litter presence. Should time allow, further work could be included to develop a predictive model of the distribution of marine litter in UK offshore waters where litter data are currently absent.

**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 will require the student to have skills in a geographical information system software such as ArcGIS or QGIS. Preference would be for use of QGIS as it is open source. JNCC would not take on responsibility to train the student in use of the software, though will offer advice and guidance on appropriate methods and packages to use. The student will also need to be competent at undertaking literature reviews.

The project would be undertaken at the student's University, but travel may be required to one of the JNCC offices (Peterborough or Aberdeen) to meet JNCC contacts for the project. Alternatively, skype meetings can be arranged.

Data provided by JNCC will be available as open data. If any as yet unpublished datasets are used, the student may be required to sign a data licence agreement for use of the data for the specific purposes of the project only, but this will be confirmed prior to commencement of the project.

The student will have free access to use of the results of the project, subject to appropriate acknowledgement of JNCC, in any written or oral use of the work. Furthermore, the student will be free to use the results to publish peer-reviewed papers, subject to agreed JNCC authorship as owners of the project concept.



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Marine Scotland Science  
Marine Laboratory  
Victoria Road  
Aberdeen  
AB11 9DB

### Name of the key contact in Organisation:

Dr Anne McLay

### Contact e-mail and phone number:

Anne.Mclay@gov.scot

0131 244 3327

### Title of proposed project:

Razor fish (*Ensis* sp) biological parameters

### Project outline and intended outcomes:

Razor fish, also known as razor clams or "spoots", are common molluscs found burrowed in sandy inter-tidal and sub-tidal areas throughout Europe. In Scottish waters there are two commercially important species: *Ensis arcuatus*, known as "bendies" and the larger pod razor *Ensis siliqua*. Fisheries for razors have increased in recent years due to growth of markets in the far east. A variety of fishing methods have been used including electrofishing.

In 2018, Scottish Ministers introduced legislation to support a scientific trial of electrofishing for razor clams. The trial is designed to further knowledge of the electrofishing method and explore the potential of a commercial razor clam electro-fishery within sustainable limits (see <https://www2.gov.scot/Topics/marine/Sea-Fisheries/management/razors> and <https://www2.gov.scot/Topics/marine/Sea-Fisheries/management/razors/trial>)

Vessels authorised to fish as part of the trial are providing a range of data and samples to Marine Scotland Science. These include samples of razor fish from different areas around Scotland which are being examined, weighed and measured with a view to deriving length/weight relationships, information on size at maturity (SoM), spawning period and growth rates, all of which potentially vary regionally and at finer spatial scales.

The student would have access to biological data already collected and be involved in working

up samples received during their placement period. They would analyse the data collected to date to derive length/weigh relationships and estimate SoM of *Ensis sili*. Contingent on progress, the student could also investigate age determination methods and estimate growth rates.

Improved estimates of the biological parameters for razor clam populations around Scotland are required for future fisheries management. Various uses of outputs from this project in stock assessment and scientific advice are anticipated.

**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 will be based at the Marine Scotland Science Marine Laboratory in Aberdeen for the duration of the project. They will require a certificate from Disclosure Scotland and be subject to other Scottish Government security checks before being able to work on the premises.

The project would suit a student with a biological background who is willing to handle and dissect shellfish. They should have good data handling and analytical skills. The ability to programme in R would be an advantage. Contingent on timing, tissue sectioning and microscopy may also be involved. Training in this and support in the analytical aspects of the project will be provided by staff at Marine Scotland Science.

It is not anticipated that field work or travel will be involved. However, there may be opportunities for the student to visit fish processors or sites where razor fish are landed.

No IPR issues are anticipated - Marine Scotland Science's policy is to publish research outputs and make data collected freely available. Any personal data may be subject to GDPR which the student will be required to comply.



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### 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. You will be provided with guidelines for supervision once the project has been confirmed.

### 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](mailto:masts@st-andrews.ac.uk)) before **16:00 on Tuesday 20<sup>th</sup> November 2018**.

Following submission of the form, it will be channelled 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, discussions will take place to ensure the most suitable student is matched with your project. It is expected that students will be assigned to projects before the end of February, although 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:**

PARTRAC LTD North East Office | Suite A10 | Milburn House | Dean Street | Newcastle Upon Tyne | NE1 1LE

**Name of the key contact in Organisation:**

Kevin Black

**Contact e-mail and phone number:**

[kblack@partrac.com](mailto:kblack@partrac.com); 0192 242 1302

**Title of proposed project:**

Development of a low cost monitoring buoy for coastal applications

**Project outline and intended outcomes:**

Increasing development of the coastal zone e.g. new port constructions, aquaculture expansion, offshore dredging often requires monitoring of coastal water properties (conductivity, temperature, turbidity etc.) of some description. In some cases the requirement for monitoring is handed down by the Regulator through license conditions, whereas in others companies and developers have monitoring requirements for internal scientific or engineering purposes.

We are interested in a development of a new monitoring buoy which uses presently available technology and is therefore low cost. The project would seek to integrate low cost sensors (T, C and / or potentially turbidity) with mobile phone or related technology and a simple, cheap buoy. The student would develop a framework within which the sensor data is logged to the telephone (offshore), which then transmits the data to a web-based (land) portal. Ideally we envisage development of an actual working demo system / prototype, however if this may be an overly ambitious objective then a desk study detailing the framework, technical requirements to bring the concept to fruition, and costs thereof, would be of interest to us.

**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?):**

We envisage the approach requires an understanding of digital sensors, power requirements, data transmission, electronic integration, mobile phone app technology, data management.

We envisage no IP issues and would require an NDA to be signed. The work would be conducted in the host University, and at a field site close by (if a prototype is developed).



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**Contact e-mail and phone number:**

[kblack@partrac.com](mailto:kblack@partrac.com); 0192 242 1302

**Title of proposed project:**

Evaluation of a new generation of biodegradeable tracers for use in sediment transport and sediment bio-mixing studies.

**Project outline and intended outcomes:**

Environmental awareness of plastics, and in particular micro-plastics, in aquatic systems has risen significantly in the last few years, and there is now a broadscale, international drive towards reducing the sources of plastics to the oceans and cleaning the plastics currently accumulated. Associated with this, the UK regulatory bodies (the NRW, EPA, MMO and Marine Scotland) have sought to ban the use of micro-plastic (aka 'thermoplastic') tracers, which are used in studies to understand the patterns, sources and sink of sediments and other particulates in the coastal environment. Partrac conducts commercial studies for clients using sediment analogues called tracers; fluorescent particles are introduced into the ocean, and the fluorescent tag allows us to track the movement of these; although our tracers are not considered microplastic formally, they do contain a minor polymeric component which is essential to binding the fluorescence to the sediment surface. Our goal is to replace this component with a fully biodegradeable, natural material. We have manufactured two tracer batches using candidate organic compounds, and we need these systematically evaluated under laboratory conditions for abrasion properties, biodegradeability, hydraulic properties and long term stability. Any trials would be tested against the current product.

We would supply the batches and work with the student to design a suitable testing programme. We anticipate a report of the findings, and a presentation to us of these.

**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?):**

We envisage appropriate techniques, including shaker flasks/abrasion tests, grain shape analysis, particle size analysis, SEM, fluorescence microscopy, microbial parameters (potentially).

We envisage no IP issues and would require an NDA to be signed. The work would be conducted in the host University laboratory, and at a field site close by (if field trials are found to be informative).



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**Name of the key contact in Organisation:**

Kevin Black

**Contact e-mail and phone number:**

[kblack@partrac.com](mailto:kblack@partrac.com); 0192 242 1302

**Title of proposed project:**

Testing of a prototype time series suspended sediment trap for coastal research

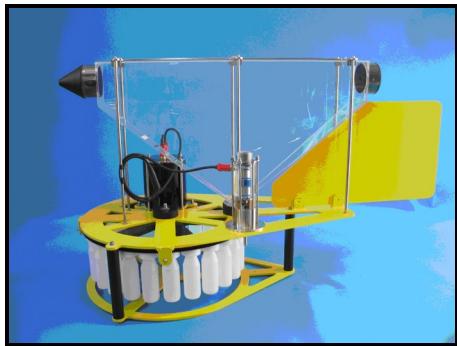
**Project outline and intended outcomes:**

Fine grained sediment-associated transport dominates the land-ocean flux of many natural and anthropogenically-derived substances transported by fluvial systems. Obtaining— representative samples of suspended sediment is of fundamental importance to studies concerned with quantifying geochemical fluxes and understanding water quality in fluvial and coastal systems. Sampling strategies aimed at obtaining detailed information on the properties of suspended sediment are constrained by several factors. Firstly, it is well known that delivery of suspended sediments by rivers is an episodic process, and documenting the temporal variability using point samplers can be difficult and often expensive. Secondly, there are issues related to whether individual instantaneous samples can be assumed to be representative of sediment transported during a longer period. Inter- and intra-storm variations in source, time-variant inputs from point-sources as well as the fundamental influence of the drainage network on flow routing, may all render this assumption invalid. There is, therefore, a general need to collect frequent samples during storm events (a time consuming and commonly expensive process), or to use flow-proportioned or time-integrating automatic samplers to collect composite samples<sup>1</sup>. Finally, in many investigations there may be a requirement for a sufficient mass of suspended sediment to permit detailed and meaningful geochemical analyses of the samples (e.g. 10 g).

In recent years we have developed a prototype version of a novel and innovative, time-integrating, time-series suspended sediment trap (referred to as 'Centurion') that can be used for fluvial (and coastal) sediment monitoring and which overcomes the above constraints. Water passes continuously (24/7) through a specially designed acrylic chamber; the ratio of the aperture (inlet) diameter to internal

1 [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=50679](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50679).

diameter is ~600 and this change provides an environment in which intercepted particles stall and settle out. Captured particles settle vertically through a funnel arrangement, and interfaced with the funnel at its base is a rotating multi-bottle carousel to provide for time-series collection of sediment. Thus, particles/aggregates which enter the trap stall or nearly stall, settle vertically a distance of ~0.4 m and are collected in a bottle. Bottles can be changed (rotated) via a user software interface (1 minute to 45 days). The entire device is either fixed to a seabed frame or suspended on a mooring wire.



Due to commercial constraints we have not, to date, rigorously tested this device. There is scope, therefore, to deploy a student here to systematically evaluate the utility of the sampler to collect suspended sediments under field conditions.

We envisage deployment of the trap at a suitable field location; the trap would be instrumented with a flow and turbidity sensor (and maybe also a pressure sensor and a discharge (cod end) sensor), and configured so that pumped water samples could be collected at the nozzle entry location simultaneously to independently check on the sediment load passing the trap. This provides a quantitative method of deriving the trap sample efficiency; we would also envisage analysis (for size, TOC) of the ambient sediment and those collected.

We will work with the student to develop a suitable experimental framework. We would expect a design report, a field installation/recovery report, and a final report containing all data analyses and findings.

**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?):**

We envisage the approach requires an understanding of instrumentation, field survey, H&S, sediment transport processes, sediment flux, sediment characterisation.

*Important Note: the size (ca. 1 m high) and weight (ca. 50 kg in air, heavier in water) means that the unit will require a truck for transport, two people to deploy, potential use of a davit/support arrangement (unless deployed using a vessel/put down on a bedframe), permissions at the deployment site and appropriate H&S arrangements.*

We envisage no IP issues and would require an NDA to be signed. The work would be conducted in the host University, and at a suitable field site close by (e.g. a relatively shallow, muddy river or channel).

## STUDENTSHIPS

**Review the availability and quality of data for use in examining potential influential factors on the distribution and abundance of salmonids in streams related to onshore wind farm developments in Scotland.**

MSS is examining the impact which onshore wind farms may have on fish populations in Scotland. Statistical models are being developed to describe the distribution and abundance of salmonids in relation to wind farm developments across Scotland and we would like to investigate the extent to which any factors such as land use, the amount of felling carried out as part of the enabling works, acidification problems, wind farm design and management contribute to the variation observed within these models.

The principal fish species in this study are Atlantic salmon and sea/brown trout which are of high conservation interest and support important fisheries of high economic value. Results from this work will underpin the advice which MSS regularly provides to Scottish Ministers in relation to Atlantic salmon and sea/brown trout populations associated with onshore wind farm developments.

The student would seek available information relating to potential influential factors including reviewing the Environmental Statements prepared by developers prior to the construction of wind farm developments and Letters of Consents provided by Scottish Ministers; these documents outline the proposed/permitted design and base line surveys of the wind farm development. GIS data sets, from SNH, FCS and CEH, may also provide suitable data which can also be explored for use as potential influential factors within our models. An analysis and interpretation of the data would be carried out and presented in the MSc report/thesis. Prior knowledge of GIS and statistics is not essential but would be useful.

Dr Emily E Bridcut |Onshore Renewables Energy Fish Advisor

Renewable Energy Environmental Advice Group

Marine Scotland Science

Scottish Government | Freshwater Fisheries Laboratory | Faskally | Pitlochry PH16 5LB

Direct Dial: +44 (0)131 2440053

S/B: +44 (0) 131 2442900

E mail: [emily.bridcut@gov.scot](mailto:emily.bridcut@gov.scot)