

Jersey Marine Research Partnership 2019

Marine research project opportunities for dissertation student dissertations at BSc and MSc Level

The Marine Biology Section (MBS) of the Société Jersiaise is a non-government organisation (NGO) which is devoted to the study and documentation of all aspects of Jersey's marine environment. The MBS undertakes voluntary and commissioned research in a number of areas often in conjunction with States of Jersey (i.e. government) departments, fishermen's associations and other NGOs. The MBS is particularly known for its work in the fields of environmental monitoring, ecological research and cultural documentation.

For several years the MBS, in partnership with the States of Jersey Department for the Environment (DoE), has assisted with the supervision of fieldwork associated with BSc and MSc student projects. This originally arose from marine biology and environmental science students approaching the MBS and DoE in search of summer project work and/or work experience. Recent topics have included projects concerning intertidal seagrass, non-native crab species, baited underwater traps, climate change monitoring and marine spatial planning. These projects are conducted to a high scientific standard and, aside from achieve high grades for the students concerned, have been used in academic publications and have even been cited as evidence in international negotiations.

Demand for project work has been such that the MBS now provides an annual list of potential topics which may be suitable for BSc or MSc long projects. Generally we have the capacity to assist with up to three student projects but will endeavour to accommodate people where possible.

As a charitable organisation operating on a low income, the MBS cannot offer funding for travel or living costs although we will assist with applying for funding from third-party sources such as the Jersey Ecology Trust Fund. In this respect, these projects are most often undertaken by Jersey-based students returning home for the summer months although we have had several BSc and MSc students come over from the UK to do their fieldwork.

Students will be given access to work space (including a government laboratory), basic field equipment and supervision as required. There is often the opportunity to assist with other NGO or government research projects in a work experience context.

The projects and local supervision are offered without charge on the understanding that all data is shared with the supporting organisations and, where relevant logged with the Jersey Biodiversity Centre. This project work often forms part of longer term monitoring or research projects and as such we request that the results are not published without prior consent from the MBS and States of Jersey.

A list of potential project ideas is provided below. Most of these projects have either been run before or cover areas that the MBS/DoE have identified as needing more information/work. However, this list is not exhaustive and we are happy to offer advice/assistance with original projects as well.

For more information about any of these projects of the MBS/DoE then please contact Francis Binney on f.binney@gov.je or 01534 441672

Marine Microplastics

Microplastics in the marine environment is an issue of concern on a global scale and Jersey is keen to gain a greater understanding of the issue locally. This project would consider the distribution, concentration and composition of microplastics in the island's beach sediments, coastal waters and outfall discharges. The study follows a 2018 dissertation that looked at beach samples and open water areas. The project would consist of sampling for, and identifying, polymer types and sizes using standard methodologies with the objective of building on current data and possibly looking for the presence of microplastics within the marine food chain. This could be analysed against regional data from France and the UK. Additionally the project could consider the sources of microplastics by looking at MCS beach clean data from recent years.

Intertidal Crab and Lobster Monitoring

The western English Channel is currently experiencing changes in its crab population, particular for born crab (*Cancer pagurus*). The intertidal zone plays an important part in the lifecycle of some crab species but there is very little data about this part of their lifecycle. This project would examine the ecology, population structure, behaviour and dynamics of several species of intertidal crab species (plus lobsters, if desired). Some data is available from a 2014 intertidal crab survey and landing and offshore survey data are available for commercial species.

Portelet Bay No Take Zone

In November 2018 the States of Jersey Marine Resources Panel agreed to a proposition by the Société Jersiaise to create a no take zone in Portelet Bay. The legislation to enable this is currently being drafted. Portelet was first proposed as a marine reserve in the 1980s following several years' survey work by Portsmouth University. The objective of having a NTZ in Portelet is to create a natural laboratory that can be utilised by universities, schools, community groups, visiting researchers and local organisations (such as Seasearch and the Société). It is hoped that the NTZ will facilitate a measurable change in the environmental and ecological health of the bay. This project would repeat some of the survey work undertaken in the 1980s to quantify any change since then and provide a baseline for future monitoring of the NTZ.

Seagrass Monitoring

Intertidal Seagrass Monitoring – *Z. noltii*

This project has been successfully run since 2013 and is ideal for under and postgraduate students in search of field and laboratory work with large datasets. Originally based on the French Water Framework Directive monitoring methodology, the project monitors the health of three of Jersey's intertidal seagrass beds via a combination of fieldwork (using quadrats and sediment cores) and laboratory and computer-based analysis. Results from this project have been impressive and the first five years' monitoring are in the process of being published. The field and lab work are flexible and can be fitted around summer work.



Subtidal - *Z. marina*

Comparatively little is known of the health of Jersey's subtidal seagrass (*Zostera marina*) beds found along the island's south and east coasts. Unlike other parts of the UK, Jersey's seagrass beds have been expanding rapidly for over ten years although why it is doing so is unknown. Preliminary research has included taking samples from a majority of Channel Island seagrass beds for chemical and isotope analysis. This has provided an evaluation of the health of individual beds. However, dataset has produced some surprising results and will be better interpreted if accompanied by a comprehensive assessment of the health and richness of the beds during peak growth in the summer. The proposal would be to use the Project Seagrass standard method but the student could look to other methodologies as suitable.

Marine Mammal Data Analysis

This is a desk-based project that will utilise two large datasets obtained by the MBS/DOE. Since April 2017 the MBS and Marine Resources have recorded 1,000+ boat encounters with dolphins, seals and one whale from Jersey's territorial waters via a smartphone app. Since June 2016 MBS/DOE has had four CPOD hydrophones situated off parts of Jersey's coastline. These record the clicks made by dolphins passing within a kilometre as well as environmental and other data. The CPODs have recorded several hundred individual dolphin encounters and the Jersey dataset has been certified as high quality by CPOD manufacturer.

These dataset has been summarily examined but it requires a full analysis using specialist software. The primary objective would be to study the occurrence, movement and behaviour of local dolphins especially in relation to environmental and other factors such as tides, time of day, etc. The large dataset means that there are several areas that this project could look at. This project would be primarily desk-based but there is scope for shore-based fieldwork and also the possibility of working with partner organisations in France and the UK.

Seagrass Reproduction

Data regarding flowering and seed production for local seagrass species (*Zostera marina* and *Zostera noltii*) are sparse. This project would assess the cycle of these events with a view to identifying their timing and trigger points. Jersey is currently participating in a reseedling trial and the student could take responsibility for measuring outputs of that trial. Additionally there may be value in investigating pollination pathways for *Z. marina*. Recently a Caribbean seagrass species *Thalassia testudinum* was shown to be pollinated by crustaceans as well as by water movement – Is this also the case with *Z. marina*?

The Ecology and Prevalence of Encrusting Non-native Species

In recent decades Jersey or Guernsey have produced first British records for several non-native marine species moving northwards in the English Channel. Of particular interest at the moment are the various encrusting non-natives arriving in our marinas and on rocky shores including sea squirts, seaweeds and bryozoans.

The project would require the student to design or adapt a rapid assessment method to determine the presence and extent of key non-native encrusting species and determine / predict the likelihood of their impacting local established species. The student could also look at potential socio-economic impacts relating to fouling or loss of amenity value caused by the target species.

The Population Dynamics of the Asian Shore Crab

In 2016 a detailed assessment was undertaken of the sudden population explosion of Asian Shore Crabs (*Hemigrapsus sanguineus*) on Jersey's East coast. First recorded in 2009, the population of *H. sanguineus* remained low until 2016 when large numbers were reported from certain intertidal areas. An initial study suggested that the crabs were preferentially colonising particular habitats. Further study is desirable to determine if the 2016 population explosion was a one-off event and whether the population has stabilised or is continuing grow.

BRUV Surveys.

In 2016 a Masters student used Baited Remote Underwater Video (BRUV) systems to examine population assemblage in various subtidal habitats around Jersey. The BRUV equipment has been retained by the Société Jersiaise and would be available for redeployment by another student to expand the study with further subtidal sites or contrasting intertidal areas. Obtaining data from a set of corresponding intertidal sites would provide an interesting dataset to examine for an undergraduate dissertation.

The Ecology of Selected Non-native Seaweeds

This project will probably need to operate over a longer time period study and so may not suit a short summer fieldwork season. Various invasive seaweed species have become well established over recent years these include, among others, *Sargassum muticum* (Wireweed), *Undaria pinnatifida* (Wakame), *Grateloupia turuturu* (Devil's Tongue). Wireweed has been locally established since 1980 and is dominant in pools and gullies throughout the summer season and competes directly with native seaweeds. Wakame and Devil's Tongue are more recent arrivals and seem to grow and die back much earlier in the year than native seaweeds. Vigorous growth appears to begin in December with the peak in early spring. It is currently unknown if and how this is impacting local marine Flora or Fauna. A study to estimate the additional local biomass created by these and other species and to see what species may profit or lose out from their presence would be of great value to the island. Field observations would need to be carried out from November through to May or June if not for a full year.

Climate change

Since the 1960s average local sea temperature have increased by over 1°C. Cold winter seas have been particularly suppressed. There is need for a desk based study focused on determining the potential economic and social impacts on commercial fish stocks of increasing sea temperature. Looking specifically at the breeding and living temperature tolerances of different commercially important fish species & their foodstuffs to predict likely impacts of ocean warming over the coming decades. The study could also look at what species may arrive and become established from the south as well as what might be lost in the coming decades either seasonally or year round.