



# FISHERIES & CONSERVATION SCIENCE GROUP

## NEWSLETTER

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## LATEST NEWS:

### LOBSTER TAGGING

How fast do lobsters grow and how far do they travel?

Lobster tagging study to begin in order to monitor growth in lobsters across Wales. This data will enable us to understand how many undersized lobsters may recruit into the fishery in 1 or 2 years time.



Image - A tagged *H. gammarus* (Leigh Howarth)



Image - Sea bass sampling kits (Giulia Cambiè)

### SEA BASS SAMPLING KITS

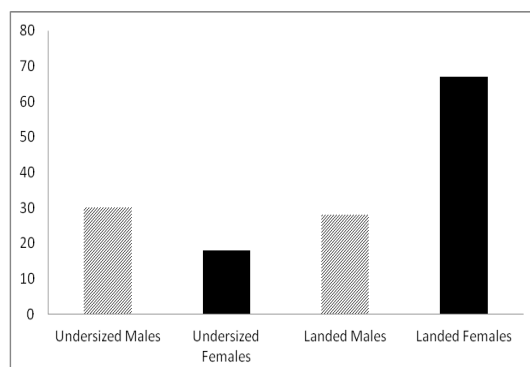
Where do bass spawn? How far do bass travel? Are bass in the North the same stock as bass in the South or even those in Spain?

Sampling kits are being handed out to commercial and recreational fishers to help answer these questions.

### ON-BOARD CAMERA

Cameras mounted on fishing vessels capture video of what is caught, landed or returned.

We can monitor sizes, sex ratios and abundance from the video footage. The image (right) shows an example of the data collected.



Number of undersized and landed male and female brown crabs caught in 86 pots. Data collected from the on-board camera.



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### FIND OUT MORE:

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Y Gronfa Pysgodfeydd Ewropeaidd:  
Buddsodi mewn Pysgodfeydd Cynaliadwy  
European Fisheries Fund: Investing in  
Sustainable Fisheries



# ALL WELSH FISHERIES

## Fisher questionnaire

### Aim:

A fishers' knowledge questionnaire has been developed to obtain information from fishers regarding fishing activity, bait use, economic importance, conflicts of interest, nursery areas and migration routes. The questionnaire includes a mapping exercise where both current and historical fishing areas are mapped and information pertaining to target species is obtained. This information will be used to guide the experimental design of the individual species projects and provide a better understanding of the spatial activity of fishing around Wales and the local ecology of target species. The precise extent of fishing grounds for example is important for the design of appropriate assessments with the industry. Results of the questionnaire should provide the industry with an activity inventory throughout Wales and highlight the importance of fishing grounds.

### Progress:

The consent form has now been finalised and three pilot questionnaires carried out with fishing industry representatives from the Science User Advisory Group (SUAG). Results from this led to refinement of the questionnaire, which was then sent to the software development company who delivered the final computerised questionnaire on the 17<sup>th</sup> May 2013. The informed consent form will allow Bangor University to protect the information given in the questionnaire. This document also outlines how data will be used, shared and published.

### Future work:

From June until August we will be carrying out the fisher questionnaire across Wales. We need you to get involved. If you are interested in participating then please register via the website or email [fisheries@bangor.ac.uk](mailto:fisheries@bangor.ac.uk).

## Habitat survey

### Aim:

To collect data on habitat types and status around the Welsh coast using the RV Prince Madog and fishing vessels. By developing underwater camera systems that can be deployed from fishing vessels, the project will enable fishers to contribute to the mapping of habitats over scallop fishing grounds and other rockier areas along the coast, i.e. lobster and crab habitats. This will provide the industry with access to equipment that can help with the identification of habitats to inform appropriate assessments required within SACs, site monitoring, etc.

### Progress:

In June and October 2012 surveys were completed with the RV Prince Madog. The report is available on the website (Report 18). Thanks to Len Walters habitat surveys in Cardigan Bay have been conducted from his fishing vessel using the mini-sled.

### Future work:

The data collected by fishers have been used to inform a side scan survey of Cardigan Bay and will be included in the report for the appropriate assessment for the fishing intensity experiment (see 'fishing intensity experiment' section).

Data from the RV Prince Madog from October 2012 will add to previous data sets to produce a report on the recovery of Cardigan Bay between 2009 and 2012.



# ALL WELSH FISHERIES

## The flying-array

The mini-sled is not appropriate to video rough, rocky or fragile habitat-types. Therefore, another underwater video system, the flying array, has been designed and successfully tested. The flying array is a towed underwater video system fitted with a video camera, LED lights and lasers (which enable accurate measurements of organisms recorded by the camera). The buoyancy and design of the unit enables it to respond to changes in slope thus “flying” over the rocky bottom, rather than being towed along the seabed like the mini-sled.

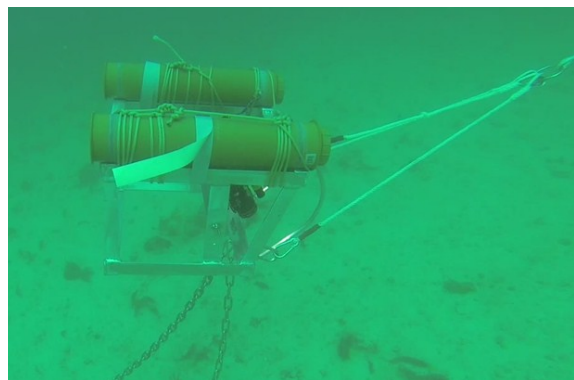


Photo of the array being towed in tests.



# SCALLOP FISHERIES

## Fishing intensity experiment

### Aim:

To conduct a fishing experiment in Cardigan Bay to help establish what fishing intensities might be acceptable and environmentally sustainable for the Cardigan Bay SAC area. The work proposed should provide the evidence needed for the management making process involving relevant stakeholders. The aims are:

1. To assess the environmental impact of scallop dredging at various intensity levels in the SAC by monitoring the seabed communities before and after fishing
2. To determine recovery rates within the SAC after various fishing intensity levels by monitoring certain sites over a 2 year period

The main outcome of this study is to inform the scallop industry of their impact on the seabed in the SAC of Cardigan Bay and help identify acceptable levels of fishing based on direct environmental impact and resilience of the area.

### Progress:

To be able to conduct the experiment, an appropriate assessment has to be carried out. The report for the appropriate assessment is currently being written, including all available evidence on substratum types in the proposed experimental area. This evidence includes and will include analyses of fishers videos (mini-sled), side scan data and OLEX maps made available by fishermen. There have been successful meetings with most Welsh scallop fishers to get their support, involvement and input. Regular meetings have also been held with the Welsh Government and CCW/NRW to ensure buy-in of all concerned parties.

### Future work:

The experiment will be conducted in collaboration with the Welsh scallop fishing fleet. The plan is to open parts of the western half of the SAC, which is currently closed to fishing, under controlled experimental conditions (i.e. restricted effort) in October 2013. Intensive sampling with the RV Prince Madog before and after opening the area will be required.



# SCALLOP FISHERIES

## Scallop stock assessment

### Aim:

To assess the status of the scallop stock and begin a time series of scallop abundance to allow a stock assessment to be conducted in the near future. This will inform the fishing industry and Welsh Government on the state of their resources and help them decide on appropriate management strategies.

### Progress:

The first survey was carried out in June 2012. This is to become an annual scientific survey to develop an unbiased index of abundance. The red bag scheme, developed by Cefas is being used to develop an age-length key of catches. This scheme has been presented to industry and the first bags have been received and processed.

### Future work:

A stock assessment survey is planned for this July and August, and the red bag scheme will be continued throughout the 2013-2014 fishing season.



The RV Prince Madog used for carrying out the stock assessment, scallop dredges waiting to be deployed

## Scallop spawning

### Aim:

To acquire data on the scallop spawning stock necessary to manage the fishery sustainably. To enable scientists and managers to better understand the stock dynamics (Where do scallops spawn? Which age classes are most fertile? Is there a difference between northern and southern stocks?) This information is essential to sustainably manage the stock and would inform research into the connectivity of the stocks. As fishing is banned between 1st May and 1st November a specific sampling strategy has to be implemented.

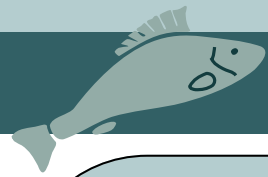
### Progress:

The project has been presented to fishers who have agreed to help with the sampling. This will involve towing a single dredge from a potting vessel bringing in samples 1-4 times per month with 20-50 scallops. Sampling may also be conducted by divers around the Llyn Peninsula. Dispensation requests are being processed by the Welsh Government.

### Future work:

Sampling will start as soon as possible if the dispensations are authorised. Scallops will be measured, weighed, aged, and gonad weight and state will be analysed to find out when and where scallops spawn. The eggs of mature individuals will be collected to estimate fecundity and egg quality.





# SEABASS FISHERIES

## Sea bass spawning areas

### Aim:

To identify local spawning areas of sea bass off the SW coast of Wales and to identify possible local sea bass stocks. This will provide insights into the possible connectivity of small spawning areas identified, and between these spawning areas and coastal feeding grounds.

### Progress:

A sampling kit has been handed out to 12 commercial and recreational inshore fishers in South Wales. The kit includes one GPS logger to give an insight into the fishing effort distribution and capture locations; 20 scale envelopes to collect scales to look at spatial movements and connectivity of bass; 20 bags to collect guts and gonads to look at the proportion of male: female bass and their maturity stage; 20 tubes containing ethanol to store fin clips for genetic analysis.

### Future work:

The fin clips will be analysed by Aquatrace to look at the connectivity of the bass stocks across Europe. Analysis of the gonads will be undertaken regularly to know the maturity stage of the individuals. Spatial interviews with fishers will start in the next few months and will help to identify the presence of local spawning aggregations.

## Sea bass recreational fisheries

### Aim:

To define a trend in abundance and/or mean body size over the past 10 years' captures. This will reduce the gap in the estimation of fishing effort (number of people involved and fishing areas) and captures (Catch per unit effort-CPUE, mean body size by area and season, male/female proportion). The Specification for an 'App' has been developed for iPhone and smartphone which links to a website so recreational fishers can upload their own data. This data will provide the baseline for a regular monitoring program of sea bass catch and effort for recreational fisheries.

### Progress:

A brochure containing the project aims and encouraging the involvement of fishers has recently been produced and distributed. We have started to collect data on past catches from logbooks of the fishing clubs of charter boats.

### Future work:

New clubs of charter boats will be contacted as well as recreational fishers from other associations. Sampling kits will be given to the recreational fishers from the Welsh federation of sea Anglers (WFSA) and BASS society.



Assessing a sea bass netters' boat for use with the on-board camera system (see 'The on-board camera')



# POTTING

## The on-board camera

### Aim:

An on-board camera system is being developed for assessment of crab and lobster fisheries. The camera captures footage of all catch, both landed and undersized, and the video is analysed to gather size, sex and abundance data which will form the basis of stock status assessment and be used to create an index of recruitment to the fishery. We are also hoping to trial this technology with the sea bass fishery.

### Progress:

The trials and validation of the camera system to collect abundance, sex and size data for crabs and lobsters are almost complete. We have piloted the system measuring crab abundance and sex data from a video of a day's pot hauling from a vessel on the Llyn peninsula. This allowed us to identify and solve any problems with the procedure. Validation of the sizes obtained from the videos was carried out using crab and lobsters from the Lobster Pot on Anglesey. The results showed the video to be an accurate measure of size and sex in crabs and larger lobsters.

Ten crab/lobster fishers have already signed up to use this system on their boats and Bangor University's workshop is currently making the housings. Each fisher with a camera system will be provided with a string of five standardised parlour pots to allow comparison between fishers and areas. These pots are ready to be distributed.

### Future work:

Once the camera housings are completed they will be fitted to the boats of crab and lobster fishers who will record one days fishing per month. The camera memory cards will be returned to Bangor University for analysis.

## Lobster tagging

### Aim:

Tagging of individual lobsters will enable growth data to be collected from re-captures. This growth data can then be used in conjunction with the size data from the on-board camera to create an index of the numbers of undersized lobster that are likely to recruit into the fishery in one and two years' time. In addition to growth data, the tagging experiment will allow us to see movements of the lobsters and, if enough are re-captured, estimate abundances using mark re-capture statistical analyses.

### Progress:

5,000 tags have been purchased and will be used pan-Wales. We have chosen sites that historically show a variety of different temperature regimes to allow us to model the effect of temperature on growth. Due to cold sea temperatures this spring lobster catch rates have been low. As it is important that we tag large numbers of lobsters in each area to increase the numbers that we are likely to recapture, we have delayed the tagging until temperatures increase in June or July.

The success of the tagging experiment relies heavily on the collaboration of the fishing industry: firstly we need the tagged lobsters not to be landed for the duration of the experiment and secondly we need the fishers to report to us any re-captures. We have communicated this project with the regional fishers' associations and we have taken out some newspaper advertisements to raise awareness of the experiment.



# POTTING

## Whelk stock status

### Aim:

The common whelk (*Buccinum undatum*) is a slow growing species with limited potential for movement. Their life history strategies make them vulnerable to over fishing and it is likely that any over exploitation would require long recovery times. Minimum landing sizes are currently set at 45mm. Previous research suggests that whelks in southern populations mature at sizes greater than this. Spatial variability in whelk abundance, size structure or sex ratio is not well documented. Environmental drivers for whelk abundance are not well understood. To provide data for stock management we are going to collect various data on parameters such as catch per unit effort, size at maturity and abundance.

### Progress:

Scientific whelk pots have been given to fishers in Swansea, Pembrokeshire, Cardigan Bay, Llŷn Peninsula and Anglesey. Fishers have two pots each and will fish these for the next 12 months. Each fisher will record spatial, temporal and environmental information from the day of catch and return the full contents of the scientific pot along with the data sheet.

### Future work:

We will engage with a greater number of fishers across Wales to obtain fisheries catch data at a finer spatial scale. We are planning a tagging study to assess the patchiness and movement patterns of whelks in response to various environmental influences. Tagging methods are currently being trialled.

## Prawn stock status

### Aim:

It is thought that the sex ratio (number of males and females in the population) may be skewed towards males as females are larger and hence are more likely to be picked off by predators. This sex ratio may be further skewed if fisheries preferentially retain females or catch only females during a spawning migration. We will compare abundance, habitat use and sex ratios between recruits, fished and un-fished adult populations and collect data to enable future stock assessment.

### Progress:

Scientific prawn pots have been handed out to fishers in Pembrokeshire, Cardigan Bay, Llŷn Peninsula and Anglesey. Fishers have two pots each and will fish these for the next 12 months. Although fishers will not be fishing prawn over the summer months, some volunteers have agreed to continue fishing the scientific pots once per month to obtain temporal data. The fisher records spatial, temporal and environmental information from the day of catch and returns the full contents of the scientific pot along with the data sheet.

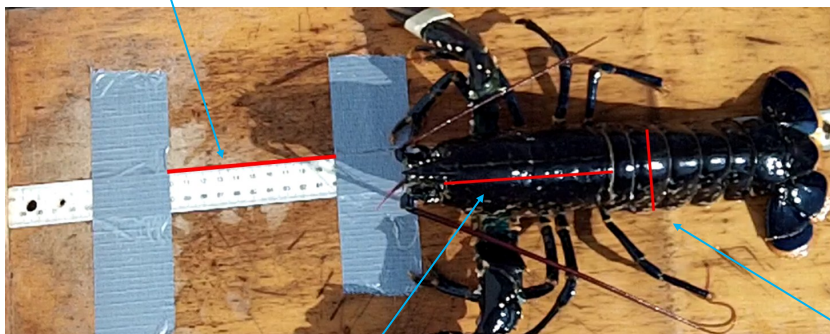
### Future work:

This coming prawn fishing season effort will increase considerably. As more fishers change from lobster or whelk fishing to prawn we will engage with a greater number of fishers across Wales to obtain data at a finer temporal and spatial scale during the winter months.



# POTTING

We need a known distance in the field of view to set the scale of the picture. Here the distance shown by the red line is 100mm.



Once the scale is set we can measure the carapace length for lobsters or the carapace length for crabs.



With lobsters we measure the abdomen width to sex them, with the crabs we can tell the sex easily as it is turned upside down.

Images taken from the on-board camera showing the measurements taken and how crab and lobsters are sexed

## Brown crab paternity

### Aim:

If female brown crabs are genetically monogamous (they bear the eggs from only one male) then the effective population size is constrained by the number of females. The removal of females from such populations leaves them vulnerable to decline in effective population size regardless of number of males. Fishery data suggests that females are more heavily harvested, and there are no current by-laws protecting gravid (berried) females. Understanding reproductive systems in brown crab will be important for informed management. This work stream will collect samples of females and eggs for genetic analysis.

### Progress:

The collection of samples of gravid females and eggs have begun and will be used for genetic analysis.

### Future work:

During this peak sampling time we will also roll out a pilot tagging study of gravid females to determine the short-term directional movements of gravid females and whether they are repeatedly caught in pots once they have exuded their eggs.



# OTHER NEWS

Goodbye to Dr Hilmar Hinz our project manager who has now left the team and to Dr Peter Duncan from the Isle of Man team.

We would like to welcome Dr Lee Murray into his new position of project manager and Dr Natalie Hold into her new position as deputy project manager.

We would also like to introduce Dr Peter Robins and Dr Simon Neill, researchers in oceanography. They are involved in work on the connectivity of Welsh stocks.



Dr Simon Neill



Dr Peter Robins