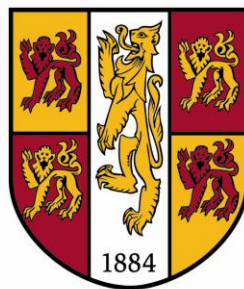




Sustainable Use of Fisheries Resources in Welsh Waters – Interim Report May 2013



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INTRODUCTION

This document forms the month fifteen interim report for the European Fisheries Fund project “Sustainable use of fisheries resources in Welsh waters”. Since the previous report in September 2012 all staff members have been appointed to post and work has started on all work packages. The Science User Advisory Group (SUAG) held its second formal meeting on the 6TH March 2013, the minutes of which form an appendix to this document. The original proposal was split into two phases in order to meet the MMO regulation that projects do not exceed two years in length. Therefore, initially phase one was approved with phase two approval dependent on progress and approval from the SUAG. Currently phase two has not been officially approved by Welsh Government. One of the principle aims of the most recent SUAG meeting was to present the progress so far and request approval to submit an application for phase two of the project, which was unanimously approved.

In accordance with the initial application this report provides outlines the work carried out to date in each of the work packages and highlights the priority work in the next few months and provides evidence to support the project variation application to proceed to phase two of the project.

WORK PACKAGE ONE – FISHER KNOWLEDGE

Fishers questionnaire

Progress: Three pilot questionnaires were carried out with fishing industry representatives from the SUAG. Results from this led to refinement of the questionnaire, which was then sent to the software development company, who will deliver the final computerised questionnaire by the 15TH May 2013.

The fishers' questionnaire had been delayed due to consultation with Bangor University's legal department regarding data protection and protecting against malicious freedom of information requests. This has resulted in the production of an informed consent form (Appendix 1) that will allow Bangor University to protect the information given in the questionnaire from such FOI requests and outlines how data will be used, shared and published.

Future work: The fishing industry will decide the scale and resolution at which data will be publically available. The questionnaire will follow the timeline shown in the table below.

Activity	Finish Date
Questionnaire software development	15TH May 2013
Questionnaire survey of fisher knowledge	15TH August 2013
Data analysis and first draft of report	15TH October 2013
Final report	15TH November 2013
Upload aggregated results to website	30TH November 2013

Communication and industry liaison

Aim: A primary goal of the initial stages of the project was to liaise with the different sectors of the fishing industry to ensure awareness of, and engagement with the project.

Progress: Awareness and engagement has been achieved by attending the Welsh fishermen's association and also the regional fishermen's associations meetings to present the project and discuss collaboration. Fishers were encouraged to give their opinion on sampling methods and approaches so that this knowledge could be incorporated into the sampling design. A list of meetings attended is shown in the table below.

A website has been established to communicate details of the project;

<http://fisheries-conservation.bangor.ac.uk/wales/>

This introduces the Fisheries and Conservation Science Groups aims and provides contact details and descriptions of team members. The website is updated with information about current and future work with details of how fishers can participate. There are videos and images of surveys conducted by the group as well as by fishers. The website provides a central point where scientific reports, publications and results can be displayed and accessed. Details of project expenditure are available and other communications such as newsletters, leaflets and flyers that have been produced are available to download. An initial Newsletter was produced in December 2012 (Appendix).

Leaflets have been produced to inform recreational sea anglers and potters about the project (Appendix); these highlighted aspects in which they can participate. For sea anglers details were provided on how to help through sample collection and sharing information from log books. For recreational potters details were given on how to help through reporting tagged lobsters and sharing information from landings.

The original proposal planned to carry out a fisher sampling training workshop. The industry feedback was that it would be very difficult to get fishermen in a single

location for a workshop. They preferred to receive training on a local scale. Therefore meetings have taken place at the level of the regional fishermen's associations and training for use of sampling equipment and participation in surveys has taken place on an individual basis.

Future work: After discussion with the fishing industry we will be updating the website more regularly, aiming for new content at least every two weeks.

The extensive paper newsletter will continue to be produced three times a year, but in addition to this the industry has requested a monthly electronic newsletter for more frequent updates. This will start in May 2013.

Several fisher's have voiced concern over sharing and protection of data collected in projects other than the questionnaire. In order to maximise engagement these issues need to be addressed and we are in the process of arranging meetings with the industry to discuss these issues. Draft consent forms have been written and approved by Bangor University's legal and FOI personnel.

Table 1. List of meetings attended up to the end of April 2013

Date	Location	Personnel involved	Person and organisation visited	Reason
27.06.2012	Grimsby	Hilmar Hinz	Seafish	Workshop on fishing impacts and fishing gear improvements.
4.07.2012	Bangor	Hilmar Hinz, Gwladys Lambert	Fish Map Mon (CCW)	Present the rational of the project and agree on collaboration.
27.07.2012	Aberystwyth	Hilmar Hinz, Gwladys Lambert, Mike Kaiser	Scallop fishing working group (WFA)	Present survey report and discuss future science goals.
15.08.2012	Swansea	Hilmar Hinz, Natalie Hold	Emma Wotton (Swansea University), Jim Evans (WFA), Andy Woolmer.	Discuss potential collaboration with respect to lobster science.
27.08.2012	Aberystwyth	Natalie Hold	Prof. Paul Shaw (Aberystwyth University)	Discuss potential collaboration with respect to genetic science.
03.09.2013	Bangor	Gwladys Lambert, Hilmar Hinz	Fish Map Mon (CCW)	Participation to the steering group
7.09.2012	Aberystwyth	All EFF personal	SUAG (Science user Advisory meeting)	First SUAG meeting to present progress of the project.
12.10.2012	Bangor	Giulia Cambie'	Harry Goudge and Liz Morris (Marine Ecosol)	Discuss collaboration and data sharing of recreational fisheries.
22.10.12	Holyhead	Gwladys Lambert, Hilmar Hinz, Harriet Salomonsen	Individual fishers	Present EFF project, introduce red bag scheme
22.10.12	Nefyn	Gwladys Lambert, Hilmar Hinz	Individual fishers	Present EFF project, introduce red bag scheme
29.10.12	Bangor	Gwladys Lambert, Hilmar Hinz	Kirsten Ramsay, Colin Charman (CCW)	Discuss fishing intensity experiment
09.11.2012	Aberystwyth	Hilmar Hinz, Giulia Cambie'	Holly Whiteley (Seafish) and Gareth Willington (fisher)	Discuss collaboration with respect to sprat fishery.
12.11.2012	Aberystwyth	Natalie Hold, Jodie Haig	CBFA	Present project ideas, receive feedback and propose collaboration.
19.11.2012	Aberystwyth	Hilmar Hinz, Giulia Cambie' , Jodie Haig, Natalie Hold, Lewis LeVay	P. Coates, G. Rees, S. Evans (WG)	Present the project and discuss collaboration, access to VMS and landings data.

22.11.2012	Nefyn	Natalie Hold, Hilmar Hinz	Jim Evans (WFA), Llyn Pot fishermen	Present project ideas, receive feedback and propose collaboration.
06.12.2012	Swansea	Giulia Cambie'	P.Coates (WG), J. Lancaster (Swansea University), I. Wisby (fisher)	Present project ideas, receive feedback and propose collaboration.
03.12.2012	Bangor	Hilmar Hinz, Gwladys Lambert	Fish Map Mon, CCW	Discuss fishing intensity levels
11.12.2012	Aberystwyth	Hilmar Hinz, Gwladys Lambert	Jim Evans (WFA), Holly Whiteley (Seafish), Phil Coates (Welsh Government), Kirsten Ramsay (CCW- on the phone)	Discuss fishing intensity trial
14.12.2012	Aberystwyth	Gwladys Lambert	WFA	Present research group, meet with scallopers and update on project.
14.01.2013	Lowestoft	All EFF personal	CEFAS	Present research projects, discuss science goals and collaboration.
16.01.2013	Bangor	Gwladys Lambert, Hilmar Hinz	Fish Map Mon (CCW)	Participation in the steering group
16.01.2013	Bangor	Gwladys Lambert, Hilmar Hinz	Kirsten Ramsay, Colin Charman (CCW)	Discuss side scan survey for fishing intensity experiment
21.01.2013	Milford Haven	Giulia Cambie', Natalie Hold	Phil Marshall (WG), sea bass fisher	Present research projects, discuss science goals and collaboration.
21.01.2013	Milford Haven	Mike Kaiser, Giulia Cambie', Natalie Hold	SWWFC	Present the project and discuss collaboration.
22.01.2013	Swansea	Mike Kaiser, Giulia Cambie', Natalie Hold	J. Lancaster (Swansea University) (morning), SWWFC (evening)	Present the project and discuss collaboration.
24.01.2013	Swansea/Burry Port	Giulia Cambie'	Matthew Dawkins (WG) (morning), 3 fishers from Burry Port (afternoon), Mumbles Motor Boat & Fishing Club (evening)	Present the project and discuss collaboration.
01.02.2013	Aberystwyth	Gwladys Lambert, Hilmar Hinz	Jim Evans, Scallop fishermen (Cardigan, Newquay, Holyhead), Phil Wensley, Bill Summerfield (WG), Holly Whiteley (Seafish)	Scallop strategy working group – Discussing fishing intensity trial and wider work
21.02.2013	Llyn Peninsula	Hilmar Hinz, Natalie Hold, Julia Pantin	Llyn Fishermen's Association	Present the project and discuss collaboration.
21.02.2013	Bangor	Jodie Haig, Giulia Cambie', Gwladys Lambert	Inshore Fisheries Group Meeting	Present the project and discuss collaboration.
01.03.2013	Menai Bridge	Gwladys Lambert, Hilmar Hinz	John Coppock, Ewout Costerus	Discuss new scallop gear – skid trials
04.03.2013	Menai Bridge	Hilmar Hinz, Gwladys Lambert, Jodie Haig, Julia Pantin, Giulia Cambie	Bill Summerfield, Phil Wensley (WG)	Discuss EFF project and WG collaboration

06.03.2013	Aberystwyth	All EFF personal	SUAG (Science user Advisory meeting)	Second SUAG meeting to present PVF and project progress.
11.03.2013	Bangor	Gwladys Lambert. Hilmar Hinz	CCW, Marine Ecosol, Andy Woolmer (Salacia Marine), Holly Whiteley (Seafish), Simon Pengelly (Southern IFCA)	Underwater video survey standardisation workshop (for fishers and researchers surveys): data standards and analysis
11.03.2013	Menai Bridge	Lee Murray, Julia Pantin, Gwladys Lambert	Colin Charman (CCW)	Discuss legislation related to EFF project and other issues related to CCW.
18.03.2013	Aberystwyth	Natalie Hold	Succorfish, Jim Evans, Holly Whiteley, Andy Woolmer	Discuss technology and fisheries science.
25.03.2013	Menai Bridge	Lee Murray, Julia Pantin	Claire Lush (9xegesis)	Discuss the development of the questionnaire software.
03.04.2013	Aberystwyth	Gwladys Lambert, Harriet Salomonsen	Jim Evans, individual fishers from Cardigan Bay and Phil Wensley (WG)	Discuss the fishing intensity experiment
04.04.2013	Holyhead	Gwladys Lambert	Jim Evans, individual fishers from Holyhead	Discuss the fishing intensity experiment
09.04.2013	Aberystwyth	Lee Murray	FishMap Mon meeting with NRW, Welsh Government, WFA, Fishing industry	Discuss FishMap Mon project
10.04.2013	Aberystwyth	Natalie Hold	Meet with CEO of NRW. Also in attendance WFA, Seafish, RSPB, Fishers, Andy Woolmer.	Discuss Natural Resources Wales and relationship with fishing industry.
16.04.2013	Telephone	Gwladys Lambert, Lee Murray	Phil Wensley, Colin Charman, Kirsten Ramsey	Discuss fishing intensity study
17.04.2013	Aberystwyth	Jodie Haig, Natalie Hold, Lee Murray, Julia Pantin	Meet CBFA members	Discuss use of escape gaps and science in relation to potting in Cardigan Bay
18.04.2013	Edinburgh	Giulia Cambie'	UKFEN (UK Fisheries Economics Network) Meeting	Update on Best Practice Guidelines for fishing industry economic impact assessment
26.04.2013	Aberystwyth	Natalie Hold, Giulia Cambie', Harriet Salomonsen	WFA meeting	Discuss involvement in data collection and improvement of communication between scientist and industry

WORK PACKAGE TWO – HABITAT SURVEY

Video Surveys

Aims: The general objective is to collect research data on habitat types and status around the Welsh coast. Part of this work is to be undertaken during surveys with the RV Prince Madog. For the rest, 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, by developing underwater camera systems that can be deployed from fishing vessels. 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: Two surveys were conducted with the RV Prince Madog. In June 2012, videos were taken during the scallop stock assessment survey. A report has been made available online (Report No. 18). In October 2012, a habitat survey was conducted. The aim was to resample sites which had been previously sampled, particularly in the Cardigan Bay SAC since 2009, in order to monitor changes over time and recovery in the closed area.

The first prototype of mini-sled (figure 1 and figure 2) has been successfully deployed on scallop grounds from a fishing vessel in the Cardigan Bay SAC to help with the appropriate assessment for the proposed fishing intensity experiment (see section “Fishing intensity experiment”). The first part of the work has been conducted in October 2012 and the survey is currently being completed. Footages from October 2012 have been analyzed and used to inform a side scan survey (see section “Side scan sonar/multibeam”).



Figure 1. Mini-sled developed to be towed from fishers' vessels. Here, only mounted with GoPro video (laser pointers and lights were added later).



Figure 2. Frame extracted from GoPro video taken with the mini-sled towed from fisher's vessel. Laser pointers 20cm apart.

The mini-sled, which is towed along the seabed, would, however, not be appropriate to video rough, rocky or fragile habitat-types. Therefore, another prototype underwater video system, the flying array, has also 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 captured by the camera). The buoyancy and design of the unit enables it to respond to changes in slope, thus “flying” over the rocky bottom (Figure 3).

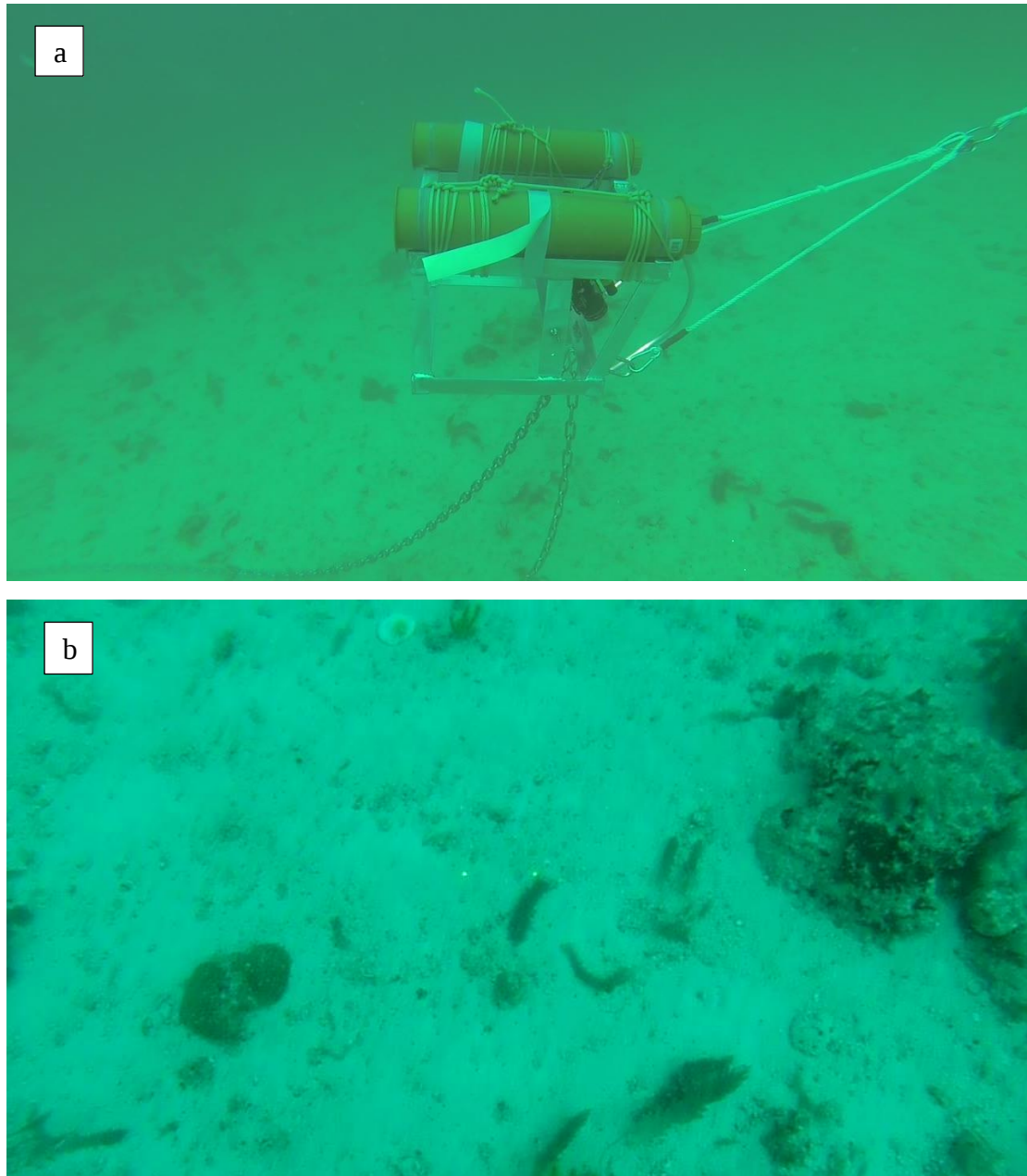


Figure 3. The flying array allows video to be taken of rocky habitat. A) Photo of the array being towed in tests. B) image from the flying array video. Two green laser dots can be seen in the centre of the image. This allows accurate measurements to be taken from the images.

Future work: Analyses of the video and images collected in October 2012 from the RV Prince Madog will make the object of a report on recovery in the Cardigan Bay between 2009 and 2012 (following the work of Sciberras et al. 2013). This report should be made available on the website in the autumn. It will include the pilot work conducted on infauna (see section “Infauna sampling (grabs)”).

The videos being currently taken by fishers with the mini-sled will be analyzed as soon as possible and included in the report for the appropriate assessment for the proposed fishing intensity experiment, due in May 2013.

Future work may also include the use of this equipment (mini-sled, flying array) to inform on stock status (videos taken from the RV Prince Madog are already used to inform on stock status of scallops in areas where dredging is not allowed, see Report No. 18).

Infauna sampling (Grabs)

Aims: Habitats can be defined as a combination of substratum types and associated living organisms. While videos and pictures will inform us on epifauna and substratum types, important information is missing for soft sediment areas. This is the case of the Cardigan Bay SAC where the focus of previous research has been epifauna and substratum type but, to our knowledge, nothing or very little is known about infaunal communities. Therefore taking infaunal grab samples would inform on the current state of the benthos in the SAC. The main objective here is to get some information on infaunal communities before conducting the fishing intensity experiment, which will aim at defining sustainable levels of scallop dredging with regards to the stock and the rest of the ecosystem.

Progress: Samples have been taken during the habitat survey in October 2012 at 5 sites in the open area of the SAC and 5 sites in the closed area (Figure 4). Sediment samples and infauna samples have been processed and analysed.

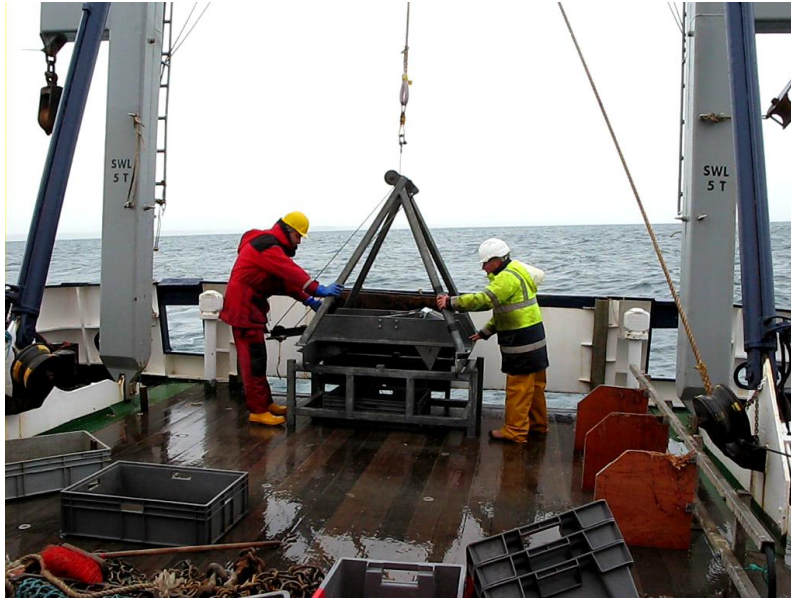


Figure 4. Grab sampling onboard RV Prince Madog, Cardigan Bay, October 2012.

Future work: The results will be included in the report on recovery in Cardigan Bay between 2009 and 2012, which will be made available online in the autumn, as mentioned above (in section “video surveys”).

Side scan sonar/multibeam

Aims: Ideally, the whole of the Welsh waters would be surveyed with multibeam. This would help to determine stocks distribution, and contribute to spatial planning. Because this is not in the remit of the current project, only small areas can be covered for specific objectives. A side scan survey has to be conducted for the appropriate assessment before the fishing intensity experiment can take place (see section “Fishing intensity experiment”). This is to make sure there are no protected features, i.e. no cobble reefs, in the potential experimental area. Multibeam will be used to monitor before/after impact of fishing during the actual experiment.

Progress: The work is underway. The survey has been conducted by the Welsh Government and the data are being analysed by Bangor University.

Future work: The raw side scan data has been received. The data will be processed as soon as possible and included in the report for the appropriate assessment.

A multibeam survey will be conducted in September 2013 and November 2013 in the experimental area to quantify fishing impacts on the substratum. Results will be made available in a report by the end of the project together with the rest of the results of the experiment (see section “Fishing intensity experiment”).

Fishing intensity experiment

Aims: The fisheries team at the School of Ocean Sciences was approached by the scallop fishing industry about the possibility to conduct a fishing experiment in Cardigan Bay that would help to establish what fishing intensities might be acceptable and environmentally sustainable for the Cardigan Bay SAC area. The work proposed should deliver the evidence basis needed for the political decision 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 would be to inform the scallop industry on their impact on the seabed in the SAC of Cardigan Bay and help them, together with the Welsh Government, to decide on acceptable levels of fishing based on direct environmental impact and resilience of the area.

Progress:

In order to be able to conduct the experiment, an appropriate assessment has to be conducted. 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 or will include the aforementioned analyses of fishers’ videos (mini-sled), side scan sonar data and OLEX maps made available by fishermen. Meetings have been successfully conducted with the industry to get support, involvement and input from most Welsh scallop fishers. Targets and deadlines have

been defined. 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.

Date to be completed by	Action
Mid May	Bangor University to submit final report for appropriate assessment to Welsh Government (if side scan and seabed videos made available on time, i.e. weather-dependent).
Mid July	- Bangor University and Industry to agree final details and conditions of the experimental fishery, in order to inform the development of the experimental fishing permit. - Ongoing development of experimental permit (by Welsh Government)
Mid August	- Welsh Government and NRW to complete appropriate assessment.
31st August	- Gear in/gear out technology and temperature loggers to be installed on all fishing vessels participating in the experimental fishery.
1st September	- Bangor University to finalise details of experiment fishery, including effort distribution and control, depending on outcomes of appropriate assessment.
Mid September	- Welsh Government to finalise and release experimental fishing permits to Industry (scientific dispensation for the fishermen).
30th Sept	Pre-fishing impact survey to be completed.
1st October	Experimental fishery to be opened.
Post-experimental fishery	Post-fishing impact survey and recovery monitoring to be conducted.

The exact details of the design of the experiment will be decided after further meetings with the industry, NRW and the Welsh Government during summer 2013 and after the appropriate assessment has been conducted. More sampling will have to be conducted at lesser intensities in defined areas during the following 24 months to monitor recovery. Those areas will be defined based on habitats and fishing distribution during the experiment, in order to monitor and compare similar habitats impacted at a range of fishing intensities. In addition to this, catches and bycatches will be monitored during the month of fishing.

A report will be made available by the end of the project and several publications will follow this work.

Gear improvement trials

Aims: The aim is to test different gear configurations of scallop dredges that may increase the environmental and stock sustainability of the fishery. Within this project we will be testing different configurations of fishing gear which have the potential to reduce by-catch, increase selectivity and mitigate impacts on benthic communities.

The main aims are:

1. To determine the effect of skid attachment (Figure 5) on catch composition, by-catch, debris and fuel consumption.
2. To determine the effect of skidded dredges on benthic communities.
3. To determine the effect of different tooth length on catch composition, by-catch, debris and fuel consumption.
4. Determine the effect of different belly ring sizes on catch composition, by-catch, debris and fuel consumption.



Figure 5. Skids attached to scallop dredges

Progress: Some trials of skid attachments have been successfully carried out from fishing boats but tow numbers were insufficient to yield conclusive results (Figure 6).



Figure 6. Load cell measuring tension on cable towing scallop dredges, as a proxy for fuel consumption.

A sampling design has been discussed in order to assess the impact of skids on the seabed in a cost-effective way (Figure 7). This design has yet to be tested.

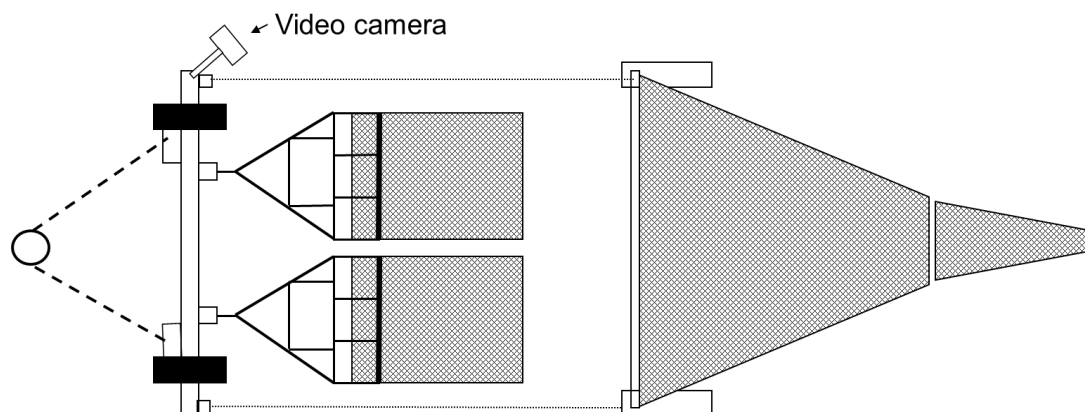


Figure 7. Testing rig for environmental impact of different scallop gears.

Future work: This work will be carried out partly in July 2013 and in spring/summer 2014 in collaboration with Ewout Costerus and John Coppock. This would help gathering evidence on the value of using skidded dredges and applying for further funding to pay for extra days at sea.

Bycatch and impacts of static gear

Aims: The Habitats Directive and Marine Strategy Framework Directive, as well as MSC certification, require data on non-target species and impacts of fishing activities. Whilst a lot of research has been carried out on mobile fishing gear in these areas, less work has been carried out on the bycatch and impacts of static gear. This work stream will collect baseline data on the bycatch and impacts of static gear in Welsh waters.

Progress: Julia Pantin, research assistant on this project, will be carrying out this work to form part of her PhD. To date Julia has carried out a literature review to identify knowledge gaps and has identified some potential methodologies, including using the on-board camera system (see work package three) to look at bycatch and underwater camera systems to look at behaviour in pots with and without escape gaps.

Future work: This work stream will continue to be developed and data collection will commence summer 2013.

WORK PACKAGE THREE – POPULATION STATUS

Sea temperature

Aims: Many biological parameters such as growth, reproduction and feeding vary substantially with sea temperature. This in turn can lead to variation in catch per unit effort with temperature during different seasons and from year to year with varying temperature. Temperature is also an important driver for currents and hence can have an impact on larval dispersal. Sea surface temperature data is available from satellite imagery. However, finer resolution empirical data of both surface and bottom temperatures would be extremely useful. This work stream, therefore, will collect a sea temperature time series from across Wales.

Progress: We have currently deployed six temperature loggers throughout Welsh waters. Initially we have five loggers deployed with commercial potters and one deployed in the Menai Strait. Fishers will be attaching the loggers to their pots to give us daily bottom sea temperatures. Figure 8 shows the data from a logger deployed from September 2012 to January 2013 off the Llyn peninsula a) inshore and b) offshore.

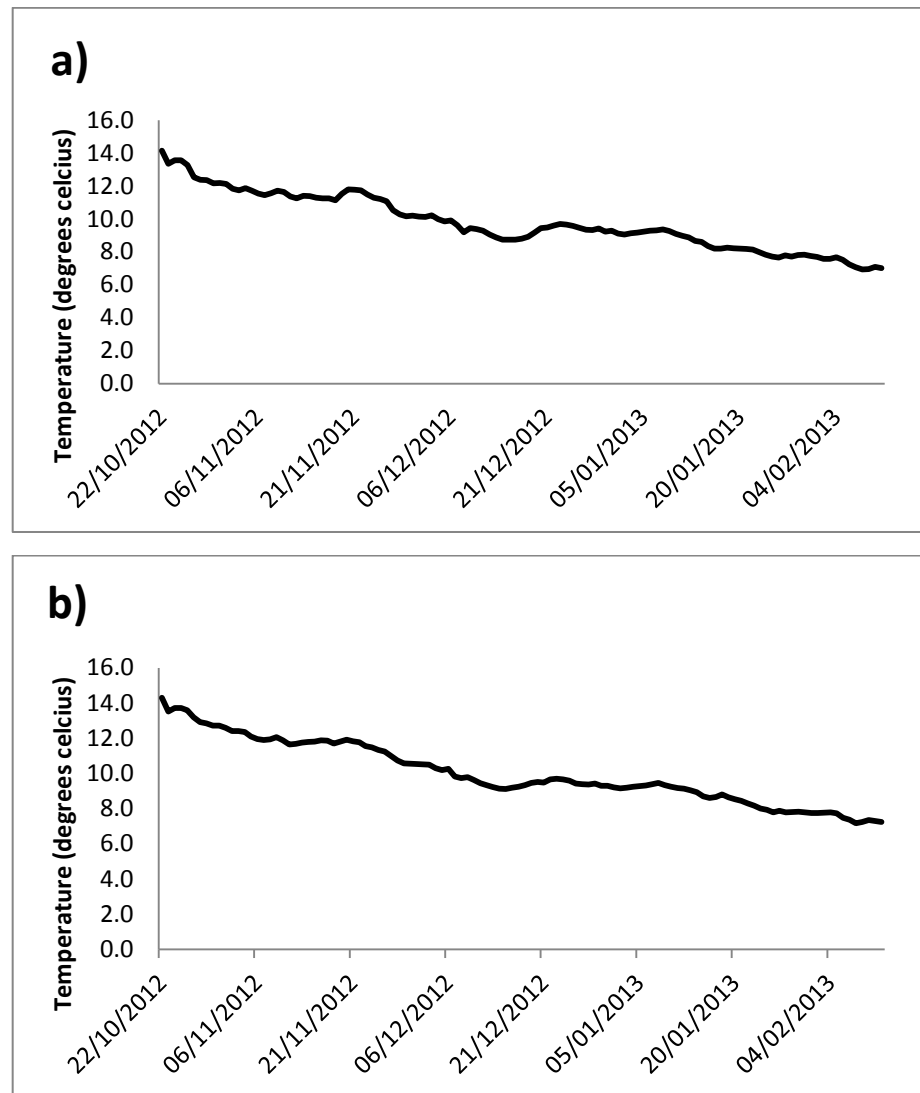


Figure 8 Results from temperature logger deployment at the Llyn Peninsula, a) shows temperature from an inshore logger and b) from an offshore logger.

Future work: We will be attaching two loggers to a semi-permanent buoy – one at the surface and one on the sea floor and deploying three of these buoys around the coast in areas from which the hydrographic modellers require more detailed data.

Due for production in May 2013, we have 30 more loggers ordered that will be deployed with fishers pan Wales. These record temperatures and depth and so can provide data on not only the sea floor temperature but also the temperature profile of the water column every time a pot is hauled. Temperature data will also be collected as part of the sea bass recruitment index work and will gather temperature data from nursery areas.

The on-board camera

Aims: 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 used to create a recruitment index. This technology will also be trialled 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 are waiting for a weather window to enable us to carry out a day of validation measurements at sea. To date 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. At that point size analysis could not be achieved due to some issues with the positioning of the crabs in the field of view and because the formula to convert the size obtained from the video to actual size needed more data. The brown crab abundance and sex results from 86 pots are shown in Figure 9.

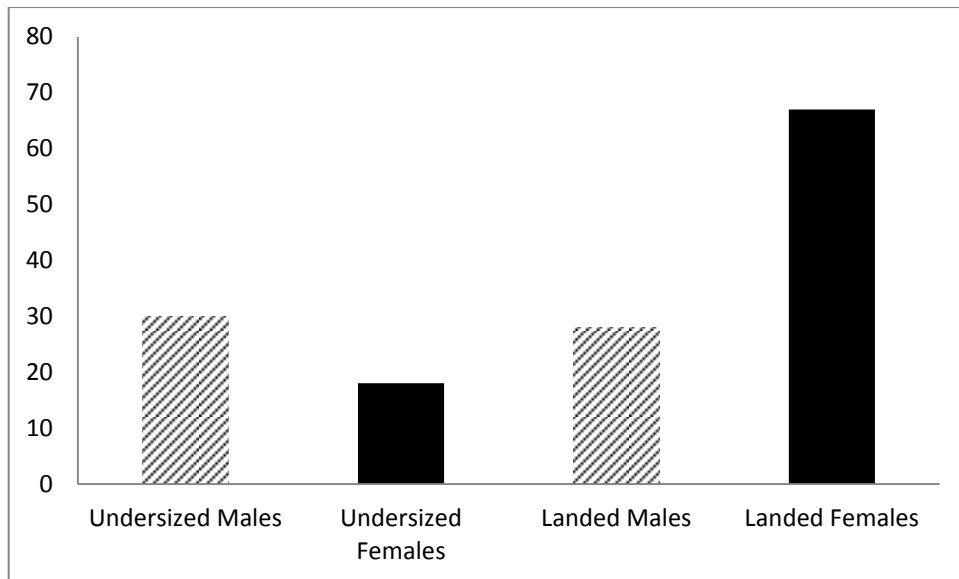


Figure 9 Number of undersized and landed male (hashed) and female (solid) brown crabs caught in 86 pots.

Initial validation of sizes obtained from video and calculation on a conversion formula (from video to actual size) was carried out using crabs and lobsters from the holding tanks at the Lobster Pot on Anglesey. The relationship between actual measurements and sizes estimated from the video can be seen in Figure 10. The R^2 value of 0.94 shows that the relationship is very strong and should give a low error rate when using the video to size crabs and lobsters. The lack of a 1:1 relationship is a consequence of the height difference between the scale in the video and the top of the carapace. The formula from this regression can be used to convert the video measurements to actual carapace length/width.

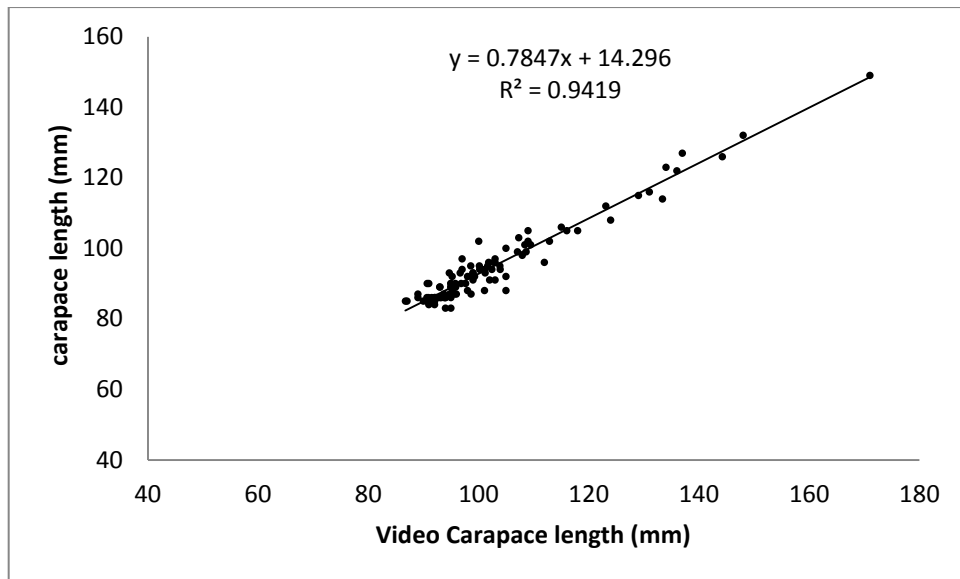


Figure 10 Relationship between carapace length measured from the on-board camera video and the actual carapace length measured in situ.

The accuracy of sex identification for crabs is 100% when the crabs are held upside down. However for lobsters it was slightly more complicated. With larger lobsters the difference between the abdomen width in males and females is clear and easily used to sex them from the video. However, at smaller sizes there is a less obvious difference and the error rate in the sex identification increases. Figure 11 shows the lobster carapace length plotted against the abdomen width for male and female lobsters. The camera housing also accommodates a small GPS logger which is time stamped to match the video footage allowing us to geo-reference all footage.

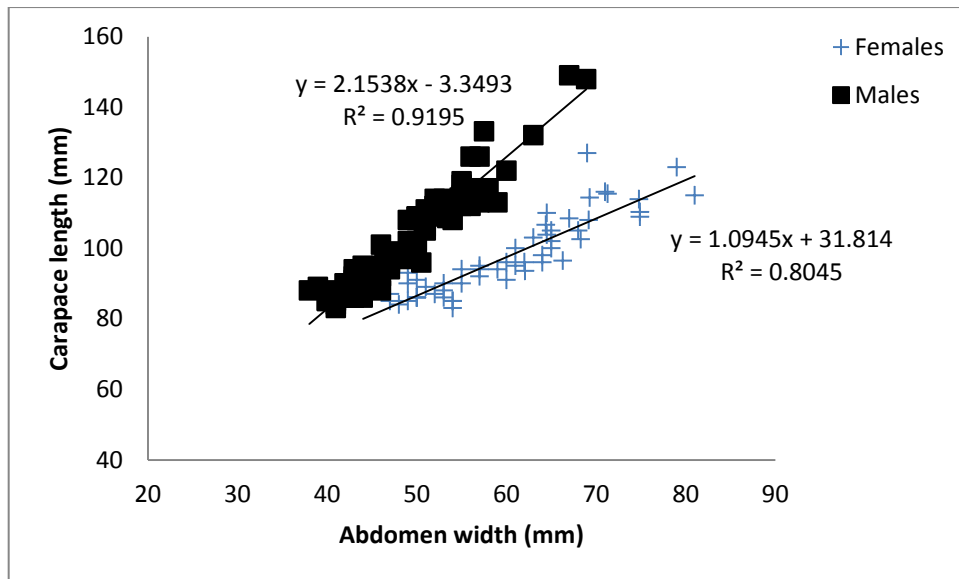


Figure 11 Relationship between carapace length and abdomen width in male (solid squares) and female (crosses) lobsters showing clear difference between the sexes in mature individuals but with less clear differences in smaller individuals.

We have ten crab/lobster fishers already signed up to use this system on their boats and Bangor University's workshop is currently making the housings. All photographic equipment has been purchased. 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 have been purchased and are ready to be distributed.

Three fishing vessels (1 gillnetter and 2 rod and liners) have been involved in the experimentation with the camera system for use with sea bass. Measurements on-board the three vessels have been taken to evaluate the best location for the camera according to the sorting techniques as well as the most useful measurement device to record the size (total length) of the fish caught (Figure 12).



Figure 12 Discussing location options for the on-board camera system with bass fishermen.

Future work: Once the camera housings are completed they will be fitted to the crab and lobster fishers boats who will record one days fishing per month. The camera memory cards will be returned to Bangor University for analysis. Alternative methods of sexing small lobsters from the video are being investigated including using the audio capabilities of the unit. Development of the technology for use with sea bass will continue.

Discussions have taken place with industry to improve these units; for example, having them hard-wired into the boats electronics to avoid the need for charging, integrating with the VMS systems. We are currently investigating alternative sources of funding for this development, but at present data collection will continue using our prototypes.

Economic performance

Aims: This study will provide economic information on the fishing fleet, describing its cost structure and economic performance;

- Estimate the economic indicators for both the individual production unit (vessel) and the fishing ground.

- Estimate the cash flow generated by the inshore fisheries and identify parameters for assessing the economic viability of these fisheries.
- Estimate the cash flow generated by the recreational fisheries.
- Comparing the magnitude of the cash flow of the two activities (commercial and recreational fisheries)

Progress: The economic questionnaire has been defined and it is now under the ethics approval processes.

Future work: The interviews will start in the next two months.

Scallops

Scallop stock assessment

Aims: The objective of this project is to assess the status of the scallop stock and start a time series of indices which will allow a stock assessment to be conducted in the near future, including calculation of Maximum Sustainable Yield (MSY). The outcome of this project will inform the fishing industry and Welsh Government on the state of their resources and help them decide on appropriate management strategies.

Progress: One aspect of this project is to conduct scientific surveys every year, at least once to develop an unbiased index of abundance. The first survey was undertaken in June 2012 and a report has been made available online (Report No. 18) (Figure 13). The other aspect is to develop an age-length key of the catches. This will be done by using the red bag scheme developed by Cefas. The scheme has been presented to the industry and the first bags have been received and processed.

Future work: A stock assessment protocol will be written, validated by external stock assessment experts and made available in a report as soon as possible. The actual date will depend on how quickly issues on VMS data and logbook data access are resolved.

A stock assessment survey will be conducted in July 2013. The survey will be repeated in summer 2014. The red bag scheme will be carried on throughout the 2013-2014 fishing season.

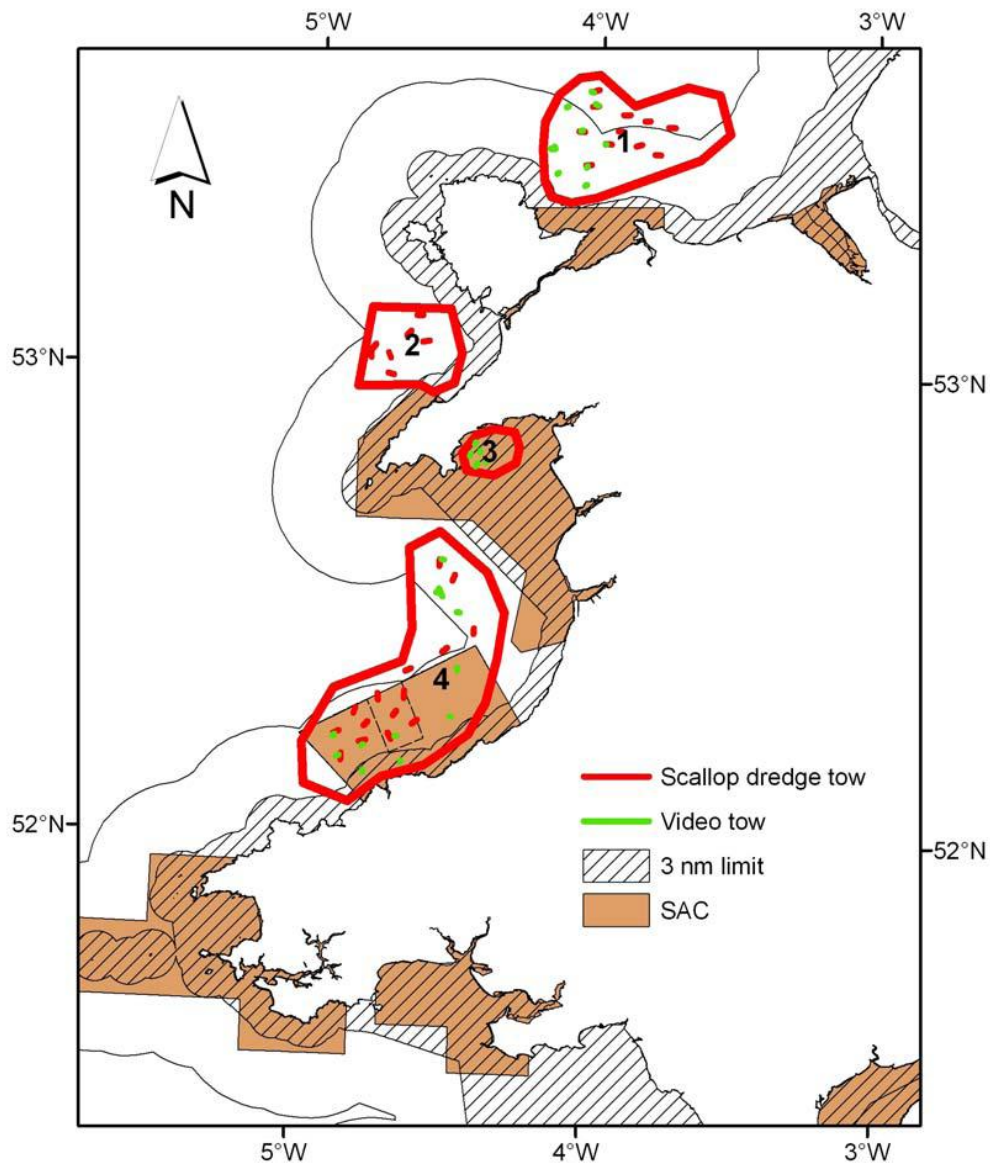


Figure 13. Scallop stock assessment survey design – June 2012. Areas 1-4 mark the 4 main scallop distribution areas in which scallops were surveyed. Areas within the 3 NM limit could only be sampled by video camera tows shown as green lines. Red lines indicate scallop dredge sampling.

Scallop spawning in Welsh waters

Aims: The proposed work aims at acquiring the necessary data on scallop spawning stock in order to manage the fishery sustainably. The outcome of this project should enable scientists and managers to understand better the stock dynamics (Where do scallops spawn? Which age classes are the most fertiles in terms of eggs numbers and eggs quality? Is there a difference between northern and more southern populations?). This information is essential in order to sustainably manage the stock, i.e. suggest areas to protect as a priority, suggest minimum/maximum landing sizes, suggest appropriate fishing season and closed seasons to maximise yield etc. It would also inform the research we are aiming to conduct regarding connectivity between Welsh populations of scallops, i.e. we need to know where and when larvae are released in order to try to model where they disperse to (Are some areas self-recruiting? Should we manage the stock as a whole or as separate entities? etc). Since scallop dredging is banned from the 1st of May until the 1st of November, a specific sampling strategy has to be implemented.

Progress: The project has been presented to fishers who agreed to help out with the sampling. Potential sampling areas have been defined based on scallop stock distribution and summer fishing grounds of the fishers willing to participate in the project (Figure 15). A protocol has been proposed and is waiting for approval from the Welsh Government.

Sampling would be done in 3 different ways: by divers (within 1 nautical mile), by pot fishers who could tow a single dredge from the potting vessel (between 1 and 12 nm) and by queenie trawlers who get king scallops in their nets as bycatches (between 1 and 12 nm). Fishers would bring back samples 1 to 4 times a month and those would be collected by the EFF team for further analyses.

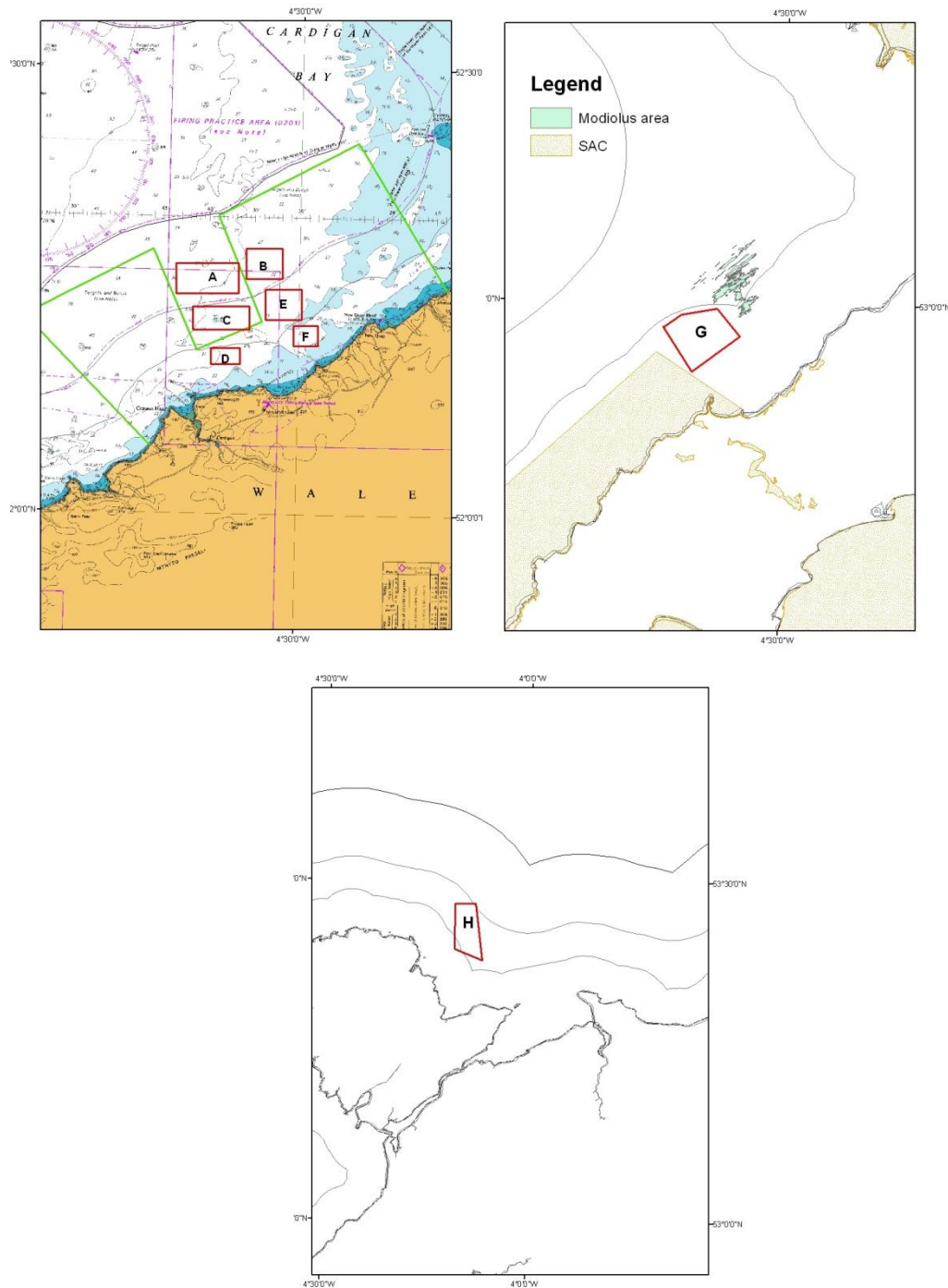


Figure 15. Areas proposed for summer sampling with a single dredge from pot fishing vessels

Future work: If the dispensations are authorized, sampling will start as soon as possible. The objective is to get a sample of 20 to 50 scallops between once and 4 times a month in each area. Each scallop will be measured, weighed, aged and the gonad weight and state will be analysed in order to calculate a gonad index and find

out where and when scallops spawn. The eggs of mature individuals will also be collected in order to estimate fertility at age and analyse egg quality at age. This work will be the subject of a report by the end of the project and a subsequent peer-reviewed publication.

Sea bass

Sea bass spawning areas

Aims: This work stream will aim to identify local small spawning areas of sea bass off the S-W coast of Wales and to identify the possible presence of a local sea bass stock. This will provide insights into the location of the spawning areas over two consecutive years. It will also provide insights into the possible connectivity between any small spawning areas identified and between these spawning areas and coastal feeding areas.

Progress: Both commercial and recreational fishers have been contacted and engaged in South Wales. A kit for biological data collection has been given to twelve commercial and recreational inshore fishers. Each kit (Figure 16) consists of:

1 GPS data logger to record the track of each fishing trip and the precise location of the hauls, 20 scales envelopes to collect scales from each bass caught, 20 bags to collect guts and gonads from each bass caught, 20 tubes containing ethanol (100%) to collect fin clips for the genetic analysis (in collaboration with Aquatrace project), 1 plastic knife (for scales), 1 tape measure (to collect the total length of each bass), 1 pencil to write the data, 1 mini-logbook to record the total capture for each haul, a complete instruction guidance for the data collection. Samples from four bass from the Llyn Peninsula have already been returned to Bangor University.

A protocol for collecting bass samples on-board a bass trawler has also been developed. This protocol aims at collecting blood samples from each bass caught and thus knowing the maturity stage of the individuals by analysing the steroid profile (in collaboration with Stirling University). It represents a method that can be used when the collection of the gonads is not possible.

Future work: Analysis of the gonads of the samples provided by fishers 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 in identify the presence of local spawning aggregations.



Figure 16: kit for biological data collection

Sea bass recreational fisheries

Aims: To define a trend in species abundance and/or mean body size over the previous 10 years' captures. This will reduce the gap in the estimation of fishing effort (number of people involved and fishing areas) and captures (CPUE, mean body size by area and season, male/female proportion). In addition there will be development of an application for iphone and smartphone with an associated website to allow recreational fishers to upload their own data. This data collection will provide a 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 (Appendix) has been produced and distributed in recent months. At the same time we started to collect data on past catches from logbooks of the fishing

clubs of charter boats. We also contacted a company for the development of a web page and smartphone/iphone application for data collection and we started to write the software specification.

Future work: The analysis of these data will be used to estimate catch per unit effort which in turn can be used to monitor trends in species abundance by area. In addition data can be used to track any changes in body size. New clubs of charter boats will be contacted to collect more historical data as well as recreational fishers from other associations. At the same time, additional kits for biological data collection will be given to the recreational fishers from Welsh federation of sea Anglers and WFSA and BASS society. The software specification will be finalized and the construction of the web page will start.

Sea bass stable isotopes

Aims: This work stream will define the possible isotopic differences between bass from north, central and south Wales, which will provide insights into migration patterns, connectivity between areas and fidelity to feeding grounds.

Progress: The same kits used in the spawning ground work stream will also collect scales for isotope analysis. A total of 12 kits have been given to commercial and recreational inshore fishers, covering hotspot areas around Wales (Swansea Bay, Burry Port, Tenby, Milford Haven, Cardigan, Aberystwyth, Llyn Peninsula, Conwy). The first scales samples have been returned already.

Future work: New samples will continue to be collected by fishers.

Sea bass recruitment index

Aims: This study will investigate the recruitment patterns and abundance of 0-group bass in nursery areas around Wales and identify possible relations between the abundance of 0-group bass in nursery areas in S-W Wales and the abundance of adult bass in the local spawning areas. This study will provide the baseline data for a regular monitoring program of the sea bass recruitment around Wales.

Progress: We have defined the protocol for the survey and identified the potential survey areas. The scientific dispensation form has been completed, and sent to the Welsh Government, that will enable us to use undersized nets in the recruitment areas.

Future work: We will acquire all the material for the surveys (nets, temperature loggers) to be able to start the sampling at the end of July.

Lobster

Lobster stock assessment and pre-recruitment index

Aim: This work package aims to collect data on the size frequencies, sex ratios and abundance indices of lobsters across Wales. In addition, catch per unit effort (CPUE) will also be calculated. The effect of temperature and other environmental parameters on CPUE will also be investigated.

Progress: This data is currently being collected using the on-board camera system. One camera is already deployed with a fisher.

Future work: Nine more camera units are currently in production and will be distributed pan Wales. This data will then be combined with growth and moulting data to create a pre-recruitment index.

Lobster Paternity

Aims: The practice of V-notching or a ban on landings of berried females can act to protect a stock of reproductively successful female lobsters. However, this can cause preferential fishing mortality of male lobsters leading to a sex bias. It is possible that inequality in the numbers of males and females could lead to low numbers of males successfully reproducing within a population; for example if females actively choose larger males, small numbers of large males may be responsible for a high proportion of the paternity. Uneven numbers of reproductively successful males compared to females can lead to decreased genetic diversity; a key factor in resilience to change.

This project provides baseline data on sex ratios of reproductive success for stock assessments (work package 3) of lobsters. Sex ratios are also key indicators of the risk of overexploitation and are important for MSC certification (principle 1).

Progress: The genetic assessment of lobster paternity was piloted at the end of 2012. This work focused on development of the genetic methods. A protocol for the extraction of DNA was successfully produced for tissue from lobster pleopods. Extraction of DNA from a pool of eggs proved to be more difficult and further trials are needed. In addition six of the microsatellite DNA markers were combined into a single reaction.

Future work: This laboratory work needs to be extended to incorporate a further three to six markers into a second reaction, which will be completed out by the end of July 2013. Samples of berried females will be collected in May and June 2013 ready to start analysis in July and August 2013. All lab work and reports are due to be completed by end of November 2013.

A comparison of the paternity of lobsters from sites with different fishing intensities will be made. We are currently looking at fishing effort across wales using the monthly shellfish returns. In addition to this, results will be compared with samples from Lundy Island's closed area. Devon and Severn Inshore Fisheries and Conservation Authority are happy to take us on their annual research cruise to collect samples in June 2013.

Tagging

Aims: 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 (Figure 17). Monthly composite sea surface temperature satellite images from NEODAAS from 2002 – 2010 were loaded into ArcMap and a new averaged layer calculated. Sites were then chosen to represent the range of temperatures seen on these images.

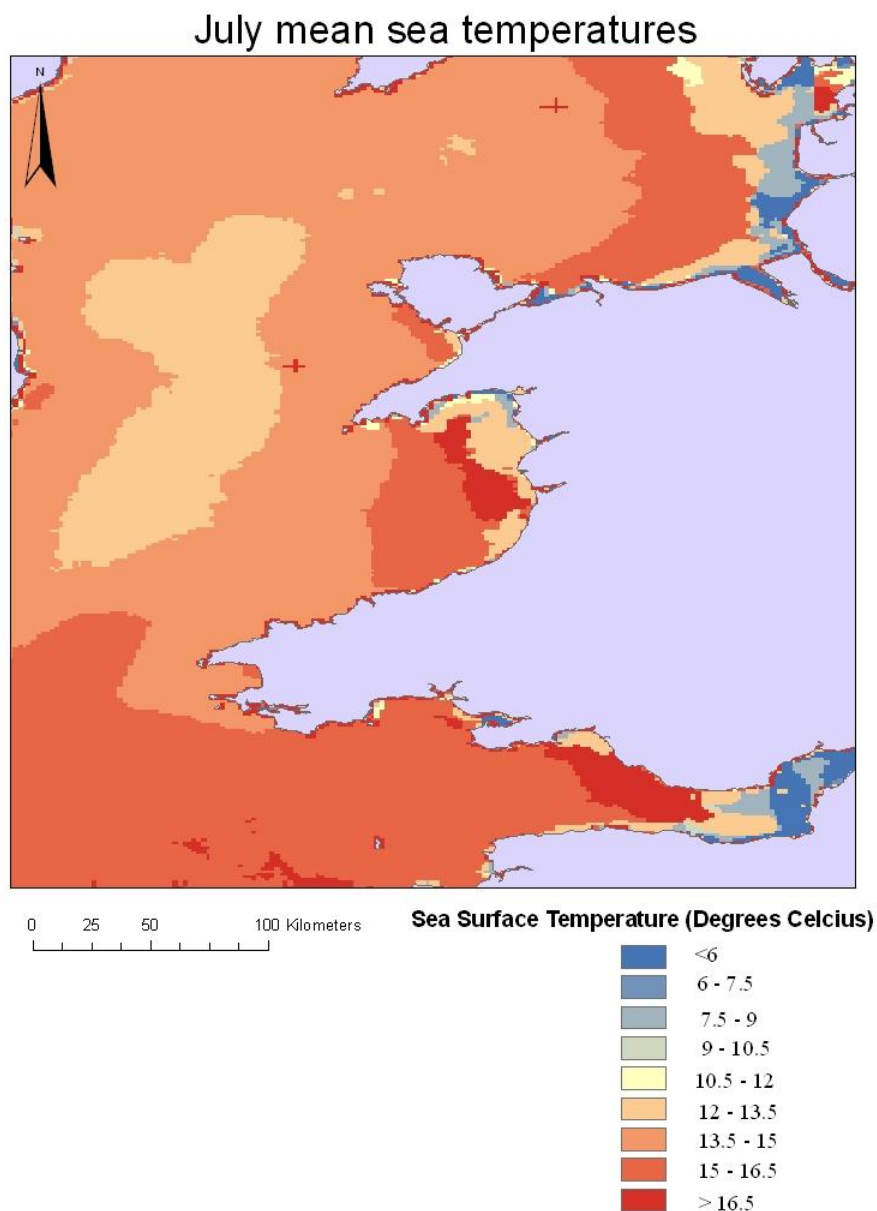


Figure 17 Average Sea Surface temperature for the month of July from 2002 – 2011

Due to cold sea temperatures this spring lobster catch rates have been lower than expected and 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 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 (Appendix).

Lobster Moulting

Aim: Moulting frequency with temperature, location and carapace length is being studied and the results will be combined with the growth increment data from the tagging to build a lobster growth model. This will be used to predict an abundance index of lobster that will recruit into the fishery in one or two years' time based on the CPUE and abundance index calculated from the on-board camera system.

Progress: The methodology being implemented is to examine a small portion of the distal pleopods, or swimming legs, under a microscope at 200x – 300x magnification. This allows us to see when the underlying tissue starts to pull back from the shell and a new "soft shell" starts to form underneath. This method has been used with other lobster species but we found no publications showing its use in the European lobster. So far we have collected test samples from five lobsters and examined them under a microscope. It appears that in April there was no evidence of the lobsters preparing for moulting but the necessary tissues were visible. (Figure 18).

Future work: Sample sites will be defined in the next few days and sampling will commence as soon as possible.

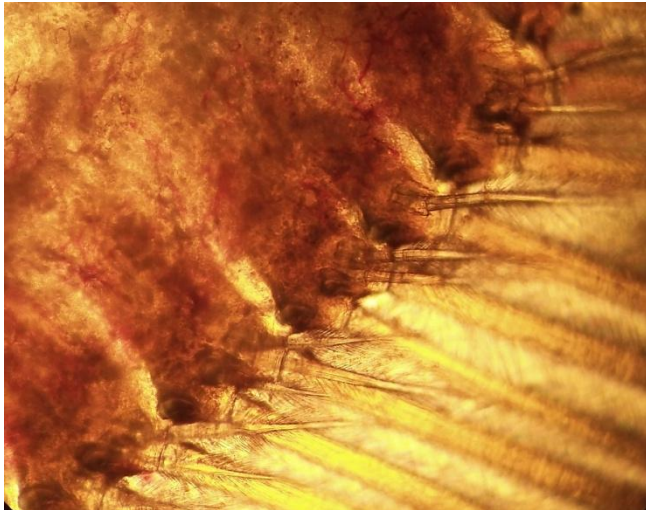


Figure 18 Photomicrograph of lobster pleopod. This individual shows no sign of the epidermis pulling away from the shell which would indicate a pre-moult stage.

Size at maturity

Aim: Minimum landing size (MLS) aims to protect juvenile animals until they are mature enough to reproduce at least once prior to recruitment to the fishery. To set the MLS based on evidence therefore requires data on the size at maturity. The current evidence suggests that the size at maturity varies significantly with location, therefore data specific to Welsh waters is essential for setting a meaningful MLS. This work stream aims to collect data on the size at onset of maturity and the size when 50% of the population are mature.

Progress: A literature review has been undertaken to identify the best methods for assessing size at maturity in lobster and the viability of using the on-board camera to take morphological measurements has been trialled.

Future work: Various methods will be implemented that use the presence of eggs on females and also changes in morphology associated with maturity to estimate size at maturity during summer 2013. A report will be completed by November 2013.

Brown crab

Brown crab stock status

Aim: The Brown Crab (*Cancer pagurus*) is broadly distributed and occupies a variety of habitats, varying with life stage. Brown crabs in Wales are caught in pots and sold for live export. Little data exists for Welsh populations; this project aims to fill vital knowledge gaps to enable a long-term goal of a pan-Wales stock assessment for this species by collecting the following data;

2. Length frequency
3. Sex ratio
4. Fecundity
5. CPUE
6. Size and seasonal onset of maturity
7. Regional variation in all biological population parameters

Progress: Much of the necessary data on size and sex will be collected using the on-board camera system. Collection of samples of gravid females and eggs have begun in order to estimate fecundity, maternal investment, female body condition and paternity of eggs (Figure 20).



Figure 20. Gravid female brown crab collected by pot fisher.

Future work: Videos from the on-board camera will continue to be analysed for size and sex data. Gravid females are primarily caught in pots in the autumn and early winter and collection of sample will continue at this time.

Brown crab paternity

Aim: If female brown crabs are genetically monogamous (they will 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 bye-laws protecting gravid 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 same samples of eggs and females collected for the stock status work stream 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.

Brown Crab Recruitment index

Aim: This work stream aims to collect data that will investigate the habitat preference of juvenile crabs and create a recruitment index for different regions in Wales.

Progress: A monthly sampling regime has been designed and was initially trialled in 2012.

Future work: These methods will be used to carry out juvenile crab surveys in both the north and south of Wales throughout summer 2013.

Whelk

Aim: The common whelk (*Buccinum undatum*) is a slow growing species with limited potential for movement, they have direct development and due to high levels of interbrood siblicide they have low per individual recruitment. 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.

Therefore in order to provide baseline data for stock management this work stream will obtain the following data on the Welsh whelk stocks:

1. Length frequency distribution (pan-Wales)
2. Sex ratio
3. Spatial variation in size structure and sex ratio
4. Catch per unit effort
5. Seasonal onset of maturity
6. Size at maturity
7. Abundance estimates using tagging and depletion experiments

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. The fisher will record 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: We will engage with a greater number of fishers across Wales to obtain fisheries catch data at a finer spatial scale.

Also planned is 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

Prawn stock status

Aim: The “common prawn” *Palaemon serratus* is a significant seasonal fishery in Welsh Waters. This species is caught predominantly in winter in baited pots and exported live to Spain and Portugal. 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 the following data to enable a future stock assessment:

1. Length frequency distribution (pan Wales)
2. Sex ratio between (fished and un-fished)
3. Size at maturity
4. Fecundity
5. Condition index of adult caught populations
6. To determine how environmental factors influence the catch (temperature, salinity, depth, inclement weather)

Progress: Scientific prawn pots (Figure 21) 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.



Figure 21. Roscoff-like prawn pot (made in Wales). Body and end mesh 8mm to retain all sizes.

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.

Prawn recruitment index

Little documentation exists on the ontogenetic (life history stage) habitat shifts of juvenile to adult *Palaemon serratus*. There are no current data for where *Palaemon* females release their larvae, or where in Wales they settle after they metamorphose into post-larval stage. Late stage *P. serratus* larvae are known to settle into shallow water coastal environments in warmer months (July – August). Larval duration is

thought to be temperature dependant. All early larval stages display little tolerance to low salinities; post larvae are also sensitive to low salinities; however, they do display a greater tolerance than the larvae. The hypothesis that temperature and rainfall play a vital role in the survival of juvenile recruits will be investigated:

1. Determine spatial variability in abundance of larval prawns
2. Describe length distribution of *P. serratus* in each habitat
3. Determine when sex is determinable (at what size/age)
4. Determine if any of the habitats fit a “nursery ground” description
5. Identify ideal nursery habitats for future annual recruitment index monitoring

Progress: A monthly sampling regime has been designed and will soon be trialled in north and south Wales. Sampling, aimed at capturing settling *P. serratus*, will be conducted in a variety of inshore habitats. Sampling will begin in May 2013 and continue until the onset of the winter fishery.

Future work: The results from the Summer 2013 sampling will inform a more targeted sampling regime for the following summer (2014). Results will be integrated with the winter fisheries data to build a complete picture of recruitment, migration and stock status.

WORK PACKAGE FOUR – CONNECTIVITY AND GENETICS

Scallop genetics

Aims: Population genetics can provide an insight into the potential connectivity between populations and can help identify any sites that potentially rely heavily on self-recruitment. Natalie Hold carried out a population genetic study on *Pecten maximus*, focused on the Isle of Man, for her PhD. This work has been extended to include Welsh samples to give a more complete picture of the genetic connectivity

and structure within the Irish Sea and how Welsh stocks fit into this picture. These combined with genetic samples from north Devon/Cornwall as well as the English Channel (in collaboration with Claire Szostek's PhD) and elsewhere in Europe will give a thorough understanding of genetic connectivity of *P. maximus*.

Progress: Scallop tissue samples from Liverpool Bay and Cardigan Bay were collected during the scallop stock assessment research cruise in June 2012. Laboratory analysis has been completed.

Future work: All data analyses and the report will be written by the end of June 2013.

Connectivity modelling

We propose to expand and improve the original work package on connectivity. This will extend the work to a wider range of species from only scallops, at present, to include several crustacean species (crab, lobster, prawn). The Susfish project had aimed to model crustaceans. However, due to a knowledge gap surrounding biological parameters for the different larval species, the Susfish model outcomes were found to be highly variable depending on the input information on larval behaviour in the water column. This study highlighted the need for accurate biological and behavioural larval data for a realistic larval dispersal model. With the focus of this project on relevance and application for the fishing industry the model needs to be species specific and include accurate larval input data rather than being a theoretical model. The proposed additional work will include experiments to study larval behaviour, and field work will use specialised multiple depth sampling plankton nets to collect information on larval spatial and vertical distribution. This information will be fed into larval models to develop more realistic predictions of dispersal from spawning areas to recruitment into populations, thereby improving our understanding of the connectivity of populations of shellfish in Welsh waters and the dependence of Welsh stocks on larvae originating inside and outside Welsh waters. It will benefit managers looking at spatial management scenarios and

provide an evidence base for development of a network of effective marine reserves. In addition, the larval data collected will also allow an understanding of the effect of female size on fecundity, larval quality and larval survival. This provides science to guide management measures such as the protection of berried females or maximum landing sizes and will allow the development of map highlighting areas with high reproductive quality.

The genetic component of the work package, to assess genetic structure of species of importance in Welsh waters, will be greatly enhanced by introducing new techniques (Restriction Associated DNA markers – RAD) which give better resolution than was possible at the time of the original proposal. This will enable determination of genetic structure at a finer resolution and to also look at structure developed by adaptation to local conditions which increases the relevance to fisheries management. Using the facilities of the advanced genome laboratory at Aberystwyth University there is the opportunity to gather genetic data that is useful at the Welsh scale rather than a regional or European wide scale.

These variations to the project will allow the original outcomes of work package four to be achieved but will also provide some extra benefits. Specifically there will be the following seven outcomes;

1. Development of a larval dispersal model specific for edible crab, prawn, lobster and scallops to understand connectivity in Welsh waters.
2. Understand the effect of female size on the fecundity, larval quality and larval survival.
3. Creation of a map of hotspots of larval production.
4. DNA sequence datasets on genetic diversity within key Welsh shellfish.
5. Assessment of genetic biodiversity, connectivity and structuring, and their relationship to habitat variation.
6. Assessment of genetic adaptation to environmental change (including fishing intensity).
7. Genomic database of Welsh shellfish stocks that may be utilised for identifying “Welsh Seafood”.

This project variation and the extra money needed to carry out this work were presented to the SUAG at a meeting on the 6TH March 2013. The group unanimously voted in favour of the changes to work package four. A Project Variation Form has been completed for this work and is awaiting approval by Bangor University finance office prior to submission.

WORK PACKAGE FIVE- ASSESSMENT AND MANAGEMENT

Knowledge and management gaps

All of the species being studied are data deficient making it difficult to base management decisions on sound evidence. The work detailed above will start to fill these knowledge gaps, thereby informing management in the future. In particular, the prawn fishery is completely unregulated and this work combined with potential baseline data collection by the Cardigan Bay Fishermen's Association will start to provide the data needed to regulate this fishery. With the shellfish regulations currently under review the data collection outlined above will help inform this process.

Priority work areas

For each species the following work streams will be priorities for informing management:

Bass – identification of spawning grounds to enable local rather than large scale management; recruitment index to monitor early indicators of changes in stock abundance.

Lobsters – size at maturity for MLS, genetic effect of sexual bias in fishing mortality to inform v-notching practices, and development of a pre-recruitment index.

Brown crab - development of a pre-recruitment index, size at maturity for MLS

Prawn – Size at maturity for MLS, development of a pre-recruitment index.

Whelk – Regional variation in size at maturity to inform MLS.

Scallops – fishing intensity experiment to provide evidence for an ecosystem based approach to management, index of abundance and start of time series of surveys for

future stock assessment (MSY), timing of spawning and age and size at maturity around the Welsh coast,

The connectivity work package, if the project variation is approved, will provide essential data and knowledge for spatial management methods, highlighting isolated and connected populations, locations with high reproductive output and quality and the reliance of Welsh stocks on local recruitment versus immigration.

APPENDICES:

- 1. SUAG MEETING MINUTES**
- 2. FISHERS QUESTIONNAIRE CONSENT FORM**
- 3. NEWSLETTER**
- 4. HOBBY POTTERS LEAFLET**
- 5. RECREATIONAL FISHERS LEAFLET**



European Fisheries Fund Project

Sustainable Use of Fisheries Resources in Welsh Waters

Science User Advisory Group Meeting – 6th March 2013



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



Llywodraeth Cymru
Welsh Government



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Sustainable Use of Fisheries Resources in Welsh Waters

Science User Advisory Group Meeting (SUAG) – 6th March 2013

Cambria House Ltd, Aberystwyth

Attendees: Bangor University: Mike Kaiser, Hilmar Hinz, Gwladys Lambert, Lee Murray, Giulia Cambie, Jodie Haig, Julia Pantin, Natalie Hold, Lewis Le Vay, Anwen Williams
Seafish: Holly Whiteley
Welsh Fishermen's Associations: Jim Evans, Carol Evans
Welsh Federation of Sea Anglers: Roger Cook
Welsh Inshore Scallop Association: Jason Thomas
Llyn Fishermen's Association: Mark Roberts
Welsh Inshore Scallop Association: Len Walters
WFA – Whitefish: Gareth Willington
Cardigan Bay Fishermen's Association: Huw Evans
Bangor Mussel Producers: Trevor Jones
Welsh Government: Jodi Massey
Countryside Council for Wales: Colin Charman, Nick Thomas

Apologies: Sion Williams Llyn Pot Fishermen's Association, Richard Dyer North Wales Fishermen's Cooperative, Phil Coates, Phil Wensley, Bill Somerfield Welsh Government, Mark Gray Seafish, Brett Garner Llyn Fishermen's Association

Minutes taken by Anwen Williams

Points of note	Actions arising
Chair of the Group: Jim Evans WFA The chairman welcomed all and introductions were made. <i>Role of the SUAG and staffing changes</i> It was noted that there were a core of attendees from industry that consistently attend the meetings, Identified a need to improve communication to increase engagement from all areas. Hilmar Hinz would be leaving at the end of the month and he was thanked for his valuable contribution to the project. After an appointment process, Dr Lee Murray would be taking over Hilmar Hinz's role. Lee has been the lead scientist on Bangor University's contract with the Isle of Man Government to deliver sustainable fisheries science. There was a discussion around the role of the new NRW body in Wales in relation to fisheries science. It was agreed that their input was necessary before the SUAG presents any of its own initiatives to Welsh Government. The group agreed unanimously to engage with NRW to clarify roles in relation to fisheries. There was a discussion about the role of scientists. LM and MJK reiterated that a scientists role was to answer questions and present options and scenarios together with outcomes. It was the SUAG's role to make decisions having considered these options and advice and then present these to Government. In order for the SUAG to operate in this manner it was considered that an independent chair should be elected to this role.	JE to chase up regarding communication issues. JE to organise meeting with CEO of NRW to outline role of SUAG and WFA initiatives. JE and MJK to write jointly to Peter Davis (commissioner for sustainable futures Wales) to ask if he would consider this role. If

Matters Arising Project re profile. The original Sustainable Fisheries in Welsh Waters project was submitted as a £2.54M project package. The Marine Management Organisation stipulated that only short projects below a certain threshold of funding would be eligible for EFF. For this reason the original package was split into two phases, phase 1 (£1,499,965) and phase 2 (£1,053,441). The Former ends in February 2014. The project needs to be reprofiled through a project variation form (PVF) to join phase 1 and 2 together. The group was asked to endorse the reprofile of the project to ensure the project funding continues until 2015. Additional work to enhance the project was outlined with a presentation of the need and benefit of including this work and the opportunity to include expertise from Aberystwyth University. The group was asked to endorse this additional budget in the PVF (£751,989) MJK raised the potential for the SUAG to have representation at the North Western Waters Regional Advisory Council that includes the Irish Sea in its remit. MJK offered to attend a meeting of this group and report back the benefit of attending. Thereafter recommended a fisherman representative of the group should attend. Report on work packages and update on progress Fishers knowledge questionnaire: This had been delayed due to the care being given to ensure that the consent agreement protected fishermen to the maximum extent possible under FOI legislation. The members of the SUAG were happy with the re wording of agreement. The questionnaire survey will be rolled out with fishermen in the late spring – early summer. Habitat surveys Cardigan Bay. There was a discussion that it would be desirable to have a multibeam survey done of the area in advance of that proposed by the MCA due to the pressing need to have a comprehensive map of Cardigan Bay to inform management. Scallop stock population biology surveys were scheduled for 2013 and 2014. In addition to the use of dredges, towed video sleds were being deployed. A floating array camera system was in production and due to be tested for use with inshore fishermen. Lobster and crab - Cameras aboard vessels were being trialled with successful outcome with crab and lobster fishers. These were collecting data with minimum interference with fishing operations. The proposal is to connect these to GPS with a company such as Succorfish. Approximately 10 boats around Wales have already been engaged for data collection for crab and lobster, aim to engage a further 5.	positive PE to be invited to next meeting for members of SUAG to consider PE as potential candidate. A show of hands was requested by JE. Bangor scientists did not vote. All other attendees were in favour of the proposed project variation. Group endorsed MJK to attend meeting and report back. Report on questionnaire survey outputs at next meeting (Bangor University) Bangor University to see if it is possible to schedule a multibeam survey in the current programme of work. JE to discuss collaboration with Succorfish on 18th March 2013.
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Data on size, sex, CPUE etc will be collected. Temperature loggers will be deployed on pots to understand the implication of temperature re stock assessment. Prawns/Whelk – fishers have started to provide samples re sex, size, maturity studies. Sea Bass - spawning grounds South Wales need to be sampled in winter 2013/14, sampling protocols have been identified in co-operation with Swansea University. Dr John Lancaster to help develop juvenile sampling with Giulia Gambie. Connectivity of stocks – Importance of PVF for this work package in order to increase realism of connectivity models and increase their use in fisheries management.. Project costs MJK highlighted to the group that the financial claims in relation to the project were posted on the website in a bid to make the project a model of transparency. AOB Historic rights 6 nautical miles – agreed that the Minister is reminded to address within current reforms. The key contentious issues lie within the 6-12 miles zone. Discussed the possibility of Bangor University providing the minister with a briefing with regards to beam trawling impacts. Mark Roberts raised the issue of MLS variation for scallops within and outwith the 12 nm zone. This presents a complicated situation and needs clarification. MJK suggested that we could look inside/outside the 12 mile to challenge current legislation – need to get scientific evidence to support any changes. IFG meetings, Andrew Lewis, Welsh Government – legislation re escape gaps in lobster pots opposed by fishers. CBFA are interested in researching escape gaps in collaboration with SeaFish. Noted that Julia Pantin will be including similar work as part of this project. Natalie Hold has allocated underwater cameras to look as juvenile lobster/crabs, we can use the same set up to look at behaviour in pots with and without escape gaps. Cardigan Bay trials might be used for this. Manx consultation – MR stated support (seconded by JE) for the Manx consultation on the queenie bye law as a model for the wider Irish Sea. Meeting end	Group asked to approve the additional work to provide briefing. Bangor staff did not vote. Remaining show of hands all agreed. Bangor University requires access to appropriate fisheries data (landings, VMS). JE to look into access issues. Bangor University to look at evidence for differences in growth rates inside and outside 12 nm within surveys proposed. JE, HE and HWh to outline specification needed. Need to understand what is cannibalised if no escape gaps
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SUSTAINABLE USE OF FISHERIES RESOURCES IN WELSH WATERS PROJECT

NAME:

FISHER QUESTIONNAIRE CONSENT FORM

Purpose: This consent form relates to use of data including personal data and fisheries data collected from individual fishers in Wales as part of the “Sustainable Use of Fisheries Resources in Welsh Waters” project. The data collected will be used solely for the purpose of providing the Welsh fishing industry and the Welsh Government with advice in relation to the sustainable use of fisheries resources in Welsh waters.

What will my data be used for? Your personal data will be held in a secure password protected database. The purpose of this database is to provide an invaluable resource for the use of the fishing industry in Wales and will form an important source of evidence for that industry. As such the intellectual property retained within the database will remain the property of the individuals who contribute to that database and the organisations that represent those individuals.

Who will be able to see the data that I have contributed? The database will be structured hierarchically and security password protected. You will have direct access to your own data. External bodies and non-industry members of the general public will have access only to anonymous and amalgamated data by fleet segment and other broad categories (e.g. the distribution of all whelk fishing activities in Welsh waters, or the distribution of under 10 m scallop dredgers in Welsh waters). At this level the resolution of the data will be 3 nm x 3 nm. Representative fishermen’s organisations may request that we produce outputs at lower resolution when this is desirable (e.g. to resolve a conflict regarding overlapping activities with conservation zones).

Will recreational fishers be able to see my data? Only at an anonymised public level. Similarly the commercial sector will not be able to see recreational fishers’ data other than at the anonymised public level unless permission is given for a higher level of resolution of data sharing.

1. **Data ownership:** the specific data provided by you will be owned you and it is acknowledged that the fisheries data in particular may be commercially sensitive. However, the Sustainable use of fisheries resources in Welsh waters project/Bangor University, will integrate the data into a database, maintain and curate this database on behalf of the Welsh fishing industry.

2. **I understand that my personal details** (e.g. name and contact details) will not be passed to any third party¹ (other than those already notified to you in this consent document) and will be deleted 5 years from the end of the project.

3. For the purpose of this project **Non-sensitive data** is defined as summaries of the anonymous² information and statistics (without the detailed location of individual fishing activities). I understand that **the sustainable use of fisheries resources in Welsh waters project** may display this data to the general public, publish and permit re-use of this non-sensitive data.

4. For the purpose of this project **Commercially Sensitive data** (raw data³) is defined as anonymous detailed maps of fisheries activities and information on species caught and the amounts caught. It is acknowledged that these are commercially sensitive and regarded as highly confidential.

¹ data Protection act (1998)

² Anonymous data is without any reference to information which could identify and individual’s identity

³ Raw data is data before any reduction in scale/detail and before processing/analysis is performed

⁴ Environmental Information Regulations 2004 and/ or Freedom of Information Act 2000

These data will be used to create fisheries activity maps (past and present) and collate background information on the ecology of target species in accordance with the objectives of the project.

a) **I understand and agree that the sustainable use of fisheries resources in Welsh waters project** will only publicly display/publish maps and data at a resolution that will be agreed in collaboration with the industry/fishers [we need to get this sorted and defined, I've suggested above, discuss within the group].

b) **I understand and agree that the sustainable use of fisheries resources in Welsh waters project will:**

- i) withhold any raw data that would infringe my personal privacy or my rights under the Data Protection Act 1998.
- ii) work with me to agree on disclosure of any data which may infringe my intellectual property rights or any raw data that would have a detrimental impact on the operation of my business, following any request for access to information⁴;
- iii) only permit access to my raw data to project staff for the purposes of this project;
- iv) share this data with other sister EFF funded projects and the future fund European Maritime and Fisheries Fund (EMFF) contributing towards the sustainability of fishing in Welsh waters, **but only with my prior agreement and the prior agreement of project partners**;
- v) agree with me, in collaboration with the other fishers / industry, what will happen to the raw data at the end of the project.

c) **I understand that** the data I provide for this project will be used for scientific purposes as outlined above which may, in collaboration with the project partners/fishers, be used to inform fisheries management **to achieve sustainable use of natural resources in Welsh waters.**

5. **I would like the following fishing organisation (of which I am a member) to have access to my raw data:**

6. **I understand that sustainable use of fisheries resources in Welsh waters** may contact me for the purpose of data clarification and to discuss any request for information which relates to my data (which may be commercially sensitive).

I would also like to be kept informed about the project by email. (YES) or (NO)

Signature:

Email:

Date:

ANNEX

Additional information

The data collected by the sustainable use of fisheries resources in Welsh waters project lead by Bangor University, will be subject to the Data Protection Act 1998, Environmental Information Regulations 2004, and Freedom of Information Act 2000. Bangor University will manage the data in line with its responsibilities under these Acts and Regulations. More information can be obtained from the University's Legal Compliance Officer¹ or from the Information Commissioner's Office at www.ico.gov.uk

Under the requirements of the Freedom of Information Act and the Environmental Information Regulations the University must provide, on request, access to recorded information held. One of the possible consequences of these statutory responsibilities is that information which the University holds as part of this project may have to be disclosed in response to a request. This is unless the University decides that one of the various statutory exemptions applies, and this decision will be based on the nature of the request received.

For example it is likely that data relating to the project which is already in the public domain and anonymised would be disclosed. However if the request was for information relating to the raw data (which you have identified as commercially sensitive) you would be contacted and, (if it was relevant to do so) you would be asked to clearly identify the relevant commercially sensitive data and give the University a reason why it should be treated confidentially. .

¹ Gwenan Hine, Senior Assistant Registrar, Registrar's Office, Bangor University, College Road,, Bangor, Gwynedd LL57 2DG
Tel: 01248 382413 Email: gwenan.hine@bangor.ac.uk



FISHERIES & CONSERVATION SCIENCE GROUP

NEWSLETTER

ISSUE 1 DECEMBER 2012

Welcome to the first issue of our newsletter for the Fisheries & Conservation Science Group.

With only 10% of Welsh fishers working offshore, the Welsh fishing industry is primarily an inshore fleet. It is therefore reliant on the sustainability of its local stocks.

There is little information on the distribution, abundance and biology of target species. This is needed for sustainable management plans.

This project aims to provide a platform for scientists and fishermen to work together to gather the data necessary to ensure the future of the Welsh fishing industry.

The project will also collaborate with Welsh Government, the Countryside Council for Wales, CEFAS and Aberystwyth University.

LATEST NEWS:



PATERNITY TESTS FOR LOBSTERS

Are European female lobsters as promiscuous as their American counterparts?

Pilot project underway to collect lobster eggs for genetics to test if European lobsters show multiple paternity.

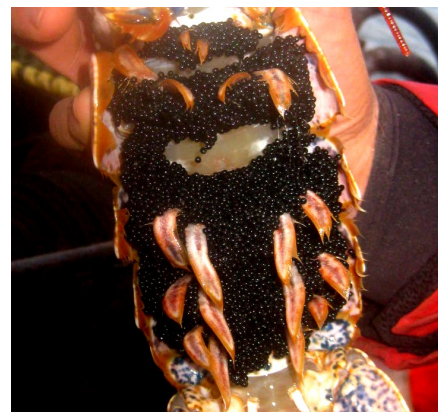


Image - Berried female *H. gammarus* (Harriet Salomonsen)

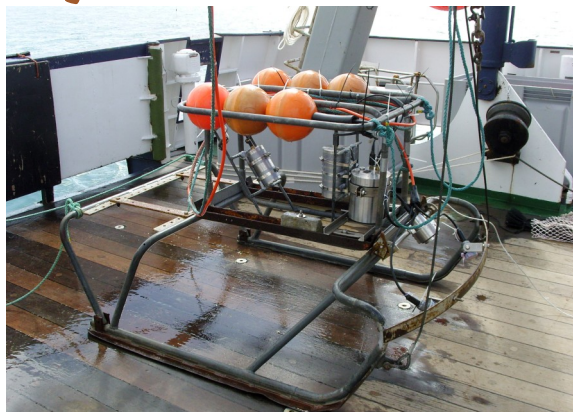


Image - Camera sled ready to be deployed (Hilmar Hinz)

MAPPING HABITATS OF SCALLOP FISHING GROUNDS

Scallop habitat surveys carried out by fishers and scientists using a newly developed versatile underwater camera system aim to fill knowledge gaps in Cardigan Bay.

SKIDS FOR SCALLOP DREDGES

Can scallop dredges be improved to reduce their environmental impact? Sea trials of skids attached to NH-dredges have been carried out to test their commercial performance.



Image - Steel skids attached to scallop dredges (Harriet Salomonsen)



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FIND OUT MORE:

fisheries-conservation.bangor.ac.uk

Email: fisheries@bangor.ac.uk

School of Ocean Sciences
Bangor University, Menai Bridge, Anglesey, LL59 5AB, UK



EUROPEAN FISHERIES FUND



FOREWORD



The Welsh Fisherman's Association – Cymdeithas Pysgotwyr Cymru Ltd (WFA-CPC) are pleased to be associated with Bangor School of Ocean Sciences and the EFF Project "Sustainable Use of Fisheries Resources in Welsh Waters". The scientific surveys outlined within the Project work packages are essential to inform the future management of fisheries and the Welsh marine environment.

In these uncertain times scientific evidence will be the foundation on which we can collaboratively future proof our industry. The WFA-CPC fully supports Bangor School of Ocean Sciences in this project, the aims and objectives, including the innovative methods being developed to collect valuable data on a variety of species of importance to Wales. This includes the participation of fishermen in collecting data for stock assessments, with remote methods that capture the data necessary without impacting on their working day. This work will be a keystone to the successful management of Welsh marine resources, an area which has historically been data deficient in Wales.

The WFA-CPC would strongly encourage industry participation in this unique opportunity to actively contribute to an extremely valuable data set that will ultimately be owned by industry and added to beyond the project term. The project has its own website (fisheries-conservation.bangor.ac.uk) which is full of useful information, videos and reports generated by the science. Fishermen can sign up for email alerts of news and reports as they arise.

We would like to wish Mike Kaiser and the Bangor School of Ocean Sciences Project Team every success with this challenging undertaking.

Jim Evans



SCALLOP FISHERIES

SKIDS FOR SCALLOP DREDGES

Scallop dredging can damage non-target species and habitats. Besides the tooth bar, the belly bag causes damage while being dragged along the seabed. Ewout Costerus of Cyclone Marine Ltd. with Dr Hilmar Hinz through the SEACAMS project have been developing a potential solution to mitigate the impacts of the belly bag. By attaching sets of steel skids to the underside of the bag it is lifted clear of the ground, potentially reducing damage on benthic fauna. Additional potential advantages are the reduced wear on bellies and decreased fuel consumption due to lower drag.

The first set of sea trials have now been carried out to test the commercial performance of these attachments thanks to Mark Roberts, Len Walters and their crews. In these trials the performance of standard dredges were compared to dredges with skids. Data collected included the amount and size of scallops caught, by-catch composition and warp tension. While these initial tests were successful further testing will be required. If you want to participate in the next trials please get in touch. The results of the first trials will shortly be available on our website.



SCALLOP FISHERIES

FISHER UNDERWATER CAMERA SLED SURVEYS

Habitat information over fishing grounds is often incomplete and can cause conflicts of interests with other marine stakeholders. To increase our knowledge of habitats it is vital that more information is being collected with the involvement of the industry. Currently we are developing an underwater video system that can be deployed from small boats by fishers. A first trial of deploying this new underwater camera system mounted on a small sled was conducted in Cardigan Bay. A total of 16 sites have been surveyed so far thanks to help from Len Walters closing some of our knowledge gaps.

HABITAT SURVEY & STOCK ASSESSEMENT

The first scallop stock assessment and habitat monitoring surveys have been successfully carried out. Areas from Liverpool Bay down to Cardigan Bay were surveyed. The initial results for the scallop stock assessment carried out in June are now available in Report No. 18 (downloadable on our website). The data for the habitats survey are currently being processed and will be available on the website once completed .

HOW TO GET INVOLVED:

If you want to participate in any of these activities

1. Conduct skid gear trials to reduce by catch and increase efficiency of dredges
2. Carry out habitat surveys using our new underwater camera sled
3. Collect data for scallop stock assessments/fishing intensity—Red Bag Scheme

Please Contact: **Dr Gwladys Lambert** (g.lambert@bangor.ac.uk).

Several initial meetings have been held to introduce ourselves, the work we are planning, and how you can get involved with the science. A meeting in Cardigan Bay is still outstanding but should be underway shortly.



ALL WELSH FISHERIES

FISHER SURVEYS

What are we doing?

We are planning to conduct a fisher survey to learn about present and past fishing patterns as well as learn about the local ecology of the target species.

Why are we doing this?

The data collected should provide a baseline to assess the spatial activity of fishing around Wales and should give us more of an insight into the local ecology of target species. The precise extent of fishing grounds for example is important for the design of appropriate stock assessments with the industry. Additionally the results of the questionnaire should provide the industry with an activity inventory throughout Wales and highlight the importance of different fishing grounds.

HOW TO GET INVOLVED:

Surveys will be held across Wales starting in January and continuing for a few months until spring. The times and dates will be available on the website.

Please email fisheries@bangor.ac.uk with the subject title **Fisher Survey** if you have any questions or want further information.

POTTING

PATERNITY TESTS FOR LOBSTERS

What are we doing?

We are currently collecting tissue samples from berried females along with samples of their eggs. We will carry out genetic tests to reconstruct paternities and estimate the number of males contributing to the fertilisation of the females in an area. This will also allow us to see if females mate with more than one male - multiple paternity.

We are hoping to compare the number of males fertilising females from commercially fished areas to the number of males fertilising females in areas closed to commercial potting, such as Lundy Island.

Why are we doing this?

Understanding the reproductive and mating behaviour of a species is vital for fisheries management decisions.

V-notching of females protects the reproductive females. However it can also result in a bias with a higher number of male lobsters being landed.

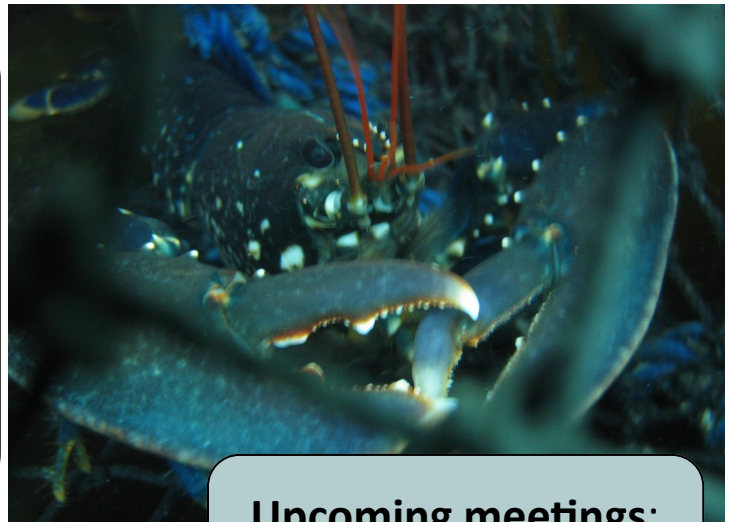
This study will enable us to understand if V-notching changes the mating behaviour of lobsters when it alters the ratio of large females to large males.

In the future...

This is a pilot study using samples collected from the Llyn Peninsula. We hope to have the results in the New Year. We will then roll it out across Wales in spring and summer 2013.

On board camera catch composition monitoring

Traditionally to conduct stock assessments for pot fisheries on board observers are required. We are currently looking at the possibility of using an on board camera system to gather catch data as we realize that having observers on board is often unfeasible and only provides limited temporal and spatial coverage. The camera system trialled should provide us with information on catch, undersized catch and the ratio of male and female crabs or lobsters in pots.



Upcoming meetings:

January 2013—Science Advisory Group Meeting

HOW TO GET INVOLVED:

If you want to get involved in:

1. Providing berried females for egg collection
2. Volunteering to take part camera monitoring

Please contact Dr Natalie Hold (n.hold@bangor.ac.uk) or Dr Jodie Haig (j.haig@bangor.ac.uk).





MEET THE TEAM...



Prof. Michel Kaiser

Professor in the School of Ocean Sciences, specialising in marine benthic ecology and fisheries science.

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Dr Lewis Le Vay

Senior lecturer in the School of Ocean Sciences, specialising in aquaculture and fisheries science.

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Dr Ian McCarthy

Senior lecturer in fish biology, specialising in physiological and behavioural ecology.

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Dr Jan Geert Hiddink

Senior lecturer in the School of Ocean Sciences, specialising in marine benthic ecology.

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Telephone: 01248 382864



Dr Hilmar Hinz

Researcher and Project Manager, specialising in benthic community ecology and fisheries science.

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Dr Lee Murray

Researcher in fisheries science. Currently advising the Isle of Man Government. Working with the scallop industry.

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Telephone: 01248 388390

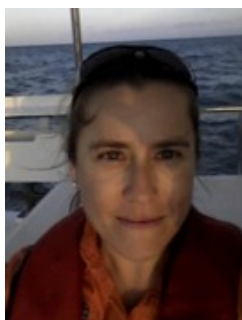


Dr Natalie Hold

Researcher in reproductive ecology and genetics. Working with the Welsh potting industry.

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Dr Jodie Haig

Researcher in invertebrate biology and ecology. Working with the Welsh potting industry.

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MEET THE TEAM...



Dr Gwladys Lambert



Researcher in fisheries science. Working with the Welsh scallop fishing industry.

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Dr Giulia Cambiè



Researcher in fisheries science and economics. Working on finfish, both with industry and recreational sea anglers.

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Dr Peter Duncan



Researcher in fisheries biology.

Currently advising the Isle of Man Government. Working with the crustacean fisheries.

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Fikret Ondes



PhD researcher looking at the ecology of the brown crab in the Isle of Man to inform sustainable management.

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Claire Szostek



PhD researcher looking at the English Channel king scallop fishery. Working closely with the UK scallop fishing industry.

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Harriet Salomonsen



Research assistant for the team. Assisting in data collection and analysis.

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Julia Pantin



Research assistant for the team. Assisting in data collection and analysis.

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Telephone: 01248 382607



Anwen Williams



Senior clerical officer. Finance and admin for the project.

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anwen.williams@bangor.ac.uk

Telephone: 01248 383177



GRŴP PYSGODFEYDD A GWYDDORAU CADWRAETH

CYLCHLYTHYR

RHIFYN 1 RHAGFYR 2012

Croeso i rifyn cyntaf cylchlythyr Grŵp Pysgodfeydd a Gwyddorau Cadwraeth.

Gyda dim ond 10% o bysgotwyr yn gweithio ar y môr, mae diwydiant pysgota Cymru yn bennaf yn llynges sy'n gweithio gyda'r glannau. Mae felly'n ddibynnol ar gynnaladwydd ei stociau lleol.

Ychydig o wybodaeth sydd ar gael am ddosbarthiad, cyflenwad a bioleg y rhywogaeth a dargedir. Mae ei angen ar gyfer cynlluniau rheoli cynladwy.

Amcan y prosiect hwn yw darparu llwyfan i wyddonwyr a physgotwyr i weithio gyda'i gilydd i gasglu data sy'n angenrheidiol i ddiogelu dyfodol diwydiant pysgota Cymru.

Bydd y prosiect hefyd yn cydweithio â Llywodraeth Cymru, Cyngor Cefn Gwlad Cymru, CEFAS a Prifysgol

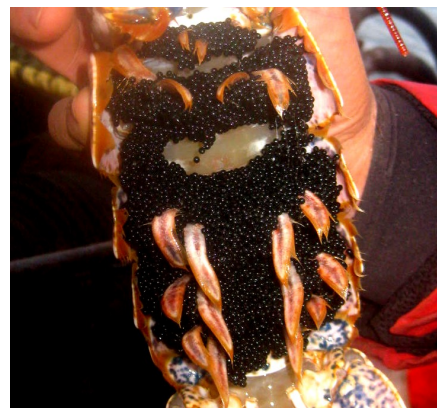
NEWYDDION DIWEDDARAF:



PROFION TADOLAETH I GIMYCHIAID

A yw cimychiaid benywaidd Ewrop mor drythyll â'u cymheiriaid Americanaidd?

Cychwynnodd prosiect peilot i gasglu wyau cimychiaid ar gyfer profion genetig i weld os oes gan gimychiaid Ewrop dadolaeth luosog.



Llun – Benyw yn llawn wyau *H. gammarus* (Harriet Salomonsen)



Llun - Sled y camera yn barod i'w ddefnyddio (H. Hinz)

MAPIO CYNEFINOEDD PYSGODFEYDD Y GRAGEN FYLCHOG

Gwneir arolygon cynefin y gragen fylchog gan bysgotwyr a gwyddonwyr yn defnyddio system gamera amlbwrpas tanddwr, newydd i lenwi bylchau gwybodaeth ym Mae Ceredigion.

LLITHRYNNAU I DYNRWYDI CREGYN BYLCHOG

A ellir gwella tynrwydi cregyn bylchog i leihau eu heffaith ar yr amgylchedd? Cynhaliwyd profion môr ar lithrynnau wrth dynrwydi New Haven i brofi eu perfformiad masnachol.



Llun - Lithrynnau dur wrth dynrwydi cregyn bylchog (Harriet Salomonsen)



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CANFOD MWY :

fisheries-conservation.bangor.ac.uk

E-bost: fisheries@bangor.ac.uk

Ysgol Gwyddorau Eigion
Prifysgol Bangor, Porthaethwy, Ynys Môn, LL59 5AB



EUROPEAN FISHERIES FUND



RHAGAIR



Mae Cymdeithas Pysgotwyr Cymru Cyf (WFA-CPC) yn falch o gael eu cysylltu ag Ysgol Gwyddorau Eigion Bangor a Phrosiect EFF "Defnydd Cynladwy o Adnoddau Pysgodfeydd yn Nyfroedd Cymru". Mae'r arolygon gwyddonol a amlinellwyd ym mhecynnau gwaith y Prosiect yn angenrheidiol i roi gwybodaeth am reoli pysgodfeydd ac amgylchedd morol Cymru yn y dyfodol.

Yn y cyfnod ansicr hwn bydd tystiolaeth wyddonol yn sylfaen y gallwn gydweithio arno i ddiogelu dyfodol ein diwydiant. Mae'r WFA-CPC yn cefnogi Ysgol Gwyddorau Eigion Bangor yn y prosiect hwn, a'i amcanion gan gynnwys y dulliau arloesol a datblygir i gasglu data gwerthfawr ar amryw o rywogaethau sy'n bwysig i Gymru. Mae hyn yn cynnwys pysgotwyr yn cymryd rhan wrth gasglu data i asesu'r stoc gyda dulliau o bell sy'n cael y data angenrheidiol heb amharu ar eu diwrnod gwaith. Bydd y gwaith hwn yn garreg sylfaen i reoli adnoddau morol Cymru yn llwyddiannus - maes a fu'n ddiffygiol o ran data yng Nghymru.

Byddai'r WFA-CPC yn annog y diwydiant yn gryf i gymryd rhan yn y cyfle unigryw hwn i gyfrannu'n weithredol at set werthfawr eithriadol o ddata a fydd yn y pendraw yn eiddo i'r diwydiant ac yr ychwanegir ato y tu hwnt i gyfnod y prosiect. Mae gan y prosiect ei wefan ei hunan (fisheries-conservation.bangor.ac.uk) sy'n llawn gwybodaeth, fideos ac adroddiadau defnyddiol wedi eu creu gan y wyddoniaeth. Gall pysgotwyr gofrestru ar gyfer derbyn e-bost yn rhoi gwybod am newyddion ac adroddiadau fel y maent yn codi.

Hoffem ddymuno pob llwyddiant i Mike Kaiser a Thîm Prosiect Ysgol Gwyddorau Eigion Bangor gyda'r fenter hon.

Jim Evans



PYSGODFEYDD Y GRAGEN FYLCHOG

LLITHRYNNAU I DYNRWYDI'R GRAGEN FYLCHOG

Gall tynrwydi i gasglu'r gragen fylchog greu niwed i rywogaethau a chynefinoedd nad ydynt wedi eu targedu. Ar wahân i'r bar danheddog, mae'r bag bol yn achosi niwed wrth gael ei dynnu ar hyd gwely'r môr. Datblygodd Ewout Costerus o Cyclone Marine Ltd a Dr Hilmar Hinz drwy'r prosiect SEACAMS atebion posibl i liniaru effeithiau'r bag bol. Wrth gydio setiau o lithrynnau dur i ochr isaf y bag mae'n ei godi'n glir o'r gwaelod, ac o bosib yn lleihau niwed i'r ffawna dyfnforol. Manteision posibl ychwanegol yw traul gostyngol ar y bagiau bol a lleihad yn y defnydd o danwydd oherwydd y llusgiad is.

Gwnaed y set gyntaf o brofion môr i brofi perfformiad masnachol y cydfannau diolch i Mark Roberts, Len Walters a'u criwiau. Yn y profion hyn cymharwyd y tynrwydi safonol a'r tynrwydi â'r llithrynnau. Roedd y data a gasglwyd yn cynnwys cyfanswm a maint y cregyn bylchog a ddaliwyd, yr hyn oedd yn y sgil ddalfa a thyndra'r ceblau. Tra roedd y profion cychwynnol hyn yn llwyddiannus bydd angen profion pellach. Os ydych am gymryd rhan yn y profion nesaf, dowch i gysylltiad. Bydd canlyniadau'r profion hyn ar gael ar ein gwefan yn fuan.



PYSGODFEYDD Y GRAGEN FYLCHOG

AROLYCON SLED CAMERA TANFOR PYSGOTWYR

Mae gwybodaeth am gynefin pysgodfeydd yn aml yn anghyflawn a gall greu gwrthdaro buddiannau â rhanddeiliaid morol eraill. I gynyddu'n gwybodaeth am gynefinoedd mae'n hanfodol fod mwy o wybodaeth yn cael ei gasglu gydag ymroddiad y diwydiant. Ar hyn o bryd rydym yn datblygu system fideo danfor y gellir ei ddefnyddio o gychod bach gan bysgotwyr. Cynhaliwyd y prawf cyntaf gyda'r camera newydd wedi'i fowntio ar sled fach ym Mae Ceredigion. Arolygwyd 16 lleoliad hyd yn hyn diolch i gymorth gan Len Walters yn cau rhai o'r bylchau yn ein gwybodaeth.

AROLWG CYNEFIN AC ASESIAD STOC

Cyflawnwyd yn llwyddiannus yr asesiad stoc ac arolygon monitro cynefin cyntaf y gragen fylchog. Arolygwyd ardaloedd o Fae Lerpwl hyd Fae Ceredigion. Mae'r canlyniadau cychwynnol o asesiad stoc y gragen fylchog a wnaed ym Mehefin bellach ar gael yn Adroddiad rhif 18 (gellir ei lwytho i lawr ar ein gwefan). Bydd data arolwg y cynefinoedd sy'n cael eu prosesu ar hyn o bryd ar gael ar y wefan unwaith y bydd wedi ei gwblhau.

SUT I GYMRYD RHAN:

Os ydych chi am gymryd rhan yn unrhyw un o'r gweithgareddau

1. Cynnal profion offer llithrynnau i ostwng y sgil ddalfa a chynyddu effeithiolrwydd y tynrwydi
2. Cynnal arolygon cynefin gan ddefnyddio ein sled camera tanfor newydd
3. Casglu data i asesu stoc y gragen fylchog/ dwyster pysgota - Cynllun y Bag Coch

Cysylltwch, os gwelwch yn dda â : **Dr Gwladys Lambert** (g.lambert@bangor.ac.uk).

Cynhaliwyd sawl cyfarfod cychwynnol i gyflwyno'n hunain, y gwaith rydym yn ei gynllunio, a sut y gellwch chi fod â rhan ynddo. Dylem gael cyfarfod am Fae Ceredigion yn fuan.



PYSGODFEYDD CYMRU GYFAN

AROLYCON PYSGOTWYR

Beth ydym yn ei wneud?

Rydym yn cynllunio cynnal arolwg pysgotwyr i ddysgu am batrymau pysgota ddoe a heddiw yn ogystal â dysgu am ecoleg lleol rhywogaethau a dargedwyd.

Pam ydym yn gwneud hyn?

Dylai'r data a gasglwyd gynnig man cychwyn i asesu gweithgaredd gofodol pysgota o amgylch Cymru a dylai roi mwy o fewnwelediad i ecoleg lleol rhywogaethau a dargedwyd. Mae union faint y pysgodfeydd, er enghraifft, yn bwysig i gynllunio'r asesiadau stoc priodol gyda'r diwydiant. Yn ychwanegol, dylai canlyniadau'r holiadur ddarparu i'r diwydiant weithgaredd rhestr drwy Gymru gyfan ac amlygu pwysigrwydd y gwahanol bysgodfeydd.

SUT I GYMRYD RHAN:

Cynhelir arolygon ar draws Cymru gan ddechrau ym mis Ionawr a pharhau am ychydig fisoedd tan y gwanwyn. Bydd yr amserau a'r dyddiadau ar gael ar y wefan.

Anfonwch e-bost at fisheries@bangor.ac.uk gyda'r teitl **Arolwg y Pysgotwyr** os oes gennych unrhyw gwestiynau neu os ydych am gael rhagor o wybodaeth.

CEWYLL

PROFION TADOLAETH I GIMYCHIAID

Beth ydym yn ei wneud?

Rydym ar hyn o bryd yn casglu samplau meinwe o fenywod llawn wyau ynghyd â samplau o'u hwyau. Byddwn yn gwneud profion genetig i ail-greu tadolaethau ac i amcangyfrif y nifer o wrywod sy'n cyfrannu at ffrwythloni'r menywod mewn ardal. Bydd hyn hefyd yn caniatáu i ni weld os yw'r menywod yn paru â mwy nag un gwryw – tadolaeth luosog.

Rydym yn gobeithio cymharu'r nifer o wrywod sy'n ffrwythloni'r menywod o ardaloedd sy'n cael eu pysgota'n fasnachol â'r nifer o wrywod sy'n ffrwythloni'r menywod mewn ardaloedd sydd wedi eu cau i gewyll masnachol, er enghraifft Ynys Wair.

Pam rydym yn gwneud hyn?

Mae deall ymddygiad atgenhedlu ac ymddygiad paru rhywogaeth yn hanfodol i benderfyniadau rheoli pysgodfeydd.

Mae rhicio'r menywod ar siâp V yn amddiffyn y rhai sy'n atgenhedlu. Fodd bynnag gall hefyd arwain at ragfarn gyda rhif uwch o gimychiaid gwryw yn cael eu dal.

Bydd yr astudiaeth hon yn ein galluogi i ddeall os yw rhicio ar siâp V yn newid ymddygiad paru'r cimychiaid pan fydd yn newid y gymhareb o fenywod mawr i wrywod mawr.

Yn y dyfodol...

Astudiaeth beilot yw hon yn defnyddio samplau a gasglwyd o Benrhyn Llŷn. Gobeithiwn gael y canlyniadau yn y Flwyddyn Newydd. Byddwn wedyn yn ei roi ar waith fesul cam ledled Cymru yng ngwanwyn a haf 2013

Camera ar fwrdd llong yn monitro cynnwys y ddalfa

Yn draddodiadol mae angen gwylwyr ar fwrdd llong i gynnal asesiadau o'r stoc i bysgodfeydd cewyll. Ar hyn o bryd rydym yn edrych ar y posibilrwydd o ddefnyddio system camera ar fwrdd llong i gasglu data'r ddalfa am nad yw cael gwylwyr ar fwrdd llong yn aml yn ymarferol ac nad yw hynny ddim ond yn cynnig ymdriniaeth amserol a gofodol cyfyngedig. Dylai'r system camera a brofwyd ddarparu gwybodaeth i ni ar y ddalfa, dalfa bychan a'r gymhareb o gimychiaid gwryw a benyw mewn cewyll.



Cyfarfodydd ar ddod:

Ionawr 2013—Cyfarfod Grŵp Ymgynghorol y Gwyddorau

SUT I GYMRYD RHAN:

Os ydych am gymryd rhan mewn :

1. Darparu menywod llawn wyau ar gyfer casglu ei hwyau
2. Gwirfoddoli i gymryd rhan yn y monitro camera

Cysylltwch, os gwelwch yn dda, â Dr Natalie Hold (n.hold@bangor.ac.uk) neu Dr Jodie Haig (j.haig@bangor.ac.uk).





DYMA'R TÎM ...



Yr Athro Michel Kaiser



Athro yn yr Ysgol Gwyddorau Eigion, yn arbenigo mewn ecoleg dyfnforol a gwyddorau pysgodfeydd.

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Dr Lewis Le Vay



Uwch ddarlithydd yn yr Ysgol Gwyddorau Eigion, yn arbenigo mewn acwafeithrin a gwyddorau pysgodfeydd.

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Dr Ian McCarthy



Uwch ddarlithydd mewn bioleg pysgod, yn arbenigo mewn ecoleg ffisiolegol ac ymddygiadol.

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Ffôn: 01248 382862



Dr Jan Geert Hiddink



Uwch ddarlithydd yn yr Ysgol Gwyddorau Eigion, yn arbenigo mewn ecoleg dyfnforol.

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Dr Hilmar Hinz



Ymchwilydd a Rheolwr y Prosiect, yn arbenigo mewn ecoleg cymunedau dyfnforol a gwyddoniaeth pysgodfeydd.

E-bost: h.hinz@bangor.ac.uk
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Dr Lee Murray



Ymchwilydd mewn gwyddoniaeth pysgodfeydd. Yn cynghori Llywodraeth Ynys Manaw ar hyn o bryd. Yn gweithio gyda'r diwydiant cregyn bylchog.

E-bost: l.murray@bangor.ac.uk
Ffôn: 01248 388390

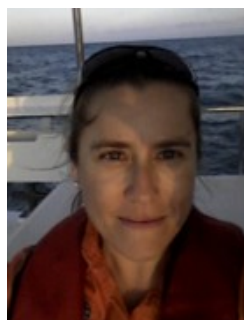


Dr Natalie Hold



Ymchwilydd mewn ecoleg atgenhedlu a geneteg. Gweithio gyda diwydiant cewyll Cymru.

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Ffôn: 01248 388425



Dr Jodie Haig



Ymchwilydd mewn bywydeg ac ecoleg anifeiliaid di-asgwrn-cefn. Gweithio gyda diwydiant cewyll Cymru.

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DYMA'R TÎM ...



Dr Gwladys Lambert



Ymchwilydd mewn gwyddoniaeth pysgodfeydd. Gweithio gyda diwydiant pysgota cregyn bylchog Cymru.

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Dr Giulia Cambiè



Ymchwilydd mewn gwyddoniaeth ac economeg pysgodfeydd. Gweithio ar bysgod esgyll, gyda'r diwydiant a physgotwyr môr sy'n hamddena.

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Dr Peter Duncan



Ymchwilydd mewn bywydeg pysgodfeydd. Yn cynghori Llywodraeth Ynys Manaw ar hyn o bryd. Gweithio gyda physgodfeydd cramenogion.

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Fikret Ondes



Ymchwilydd PhD yn edrych ar ecoleg y cranc coch yn Ynys Manaw i gael gwybodaeth er mwyn rheoli cynladwy.

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Claire Szostek



Ymchwilydd PhD yn edrych ar bysgodfa cregyn bylchog y Sianel. Gweithio'n agos gyda diwydiant pysgota cregyn bylchog y DU.

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Harriet Salomonsen



Cynorthwydd ymchwil i'r tîm. Cynorthwyo i gasglu a dadansoddi data.

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Julia Pantin



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Anwen Williams



Uwch swyddog clerigol. Gwaith cyllid a gweinyddu'r prosiect.

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Ffôn: 01248 383177



Gwyddor Pysgodfeydd a Chadwraeth

Fisheries & Conservation Science



SUSTAINABLE USE OF FISHERIES RESOURCES IN WALES

This European Fisheries Fund project is led by the fishing industry and Bangor University. About 90% of the Welsh fleet is comprised of inshore vessels that depend on healthy local stocks of commercial species to support their livelihoods.

This project aims to provide a platform for scientists and fishermen to work together to gather the data and scientific evidence necessary to ensure a sustainable and profitable future for the Welsh fishing industry.

The project website is a source of information for fishermen and provides more detail on the aims and objectives, plus reports, videos, maps and other information: <http://fisheries-conservation.bangor.ac.uk>



WE NEED **YOU** TO GET INVOLVED WITH FISHERIES RESEARCH

Currently we have little information on the contribution that recreational potters make to the overall catch of crabs, lobsters, prawns and whelks. This information is vital to the sustainable management of these fisheries. To enable us to understand the state of these stocks we need accurate estimates of what is landed (killed) and where it is caught and when.

You can contact us by phone, email or via registering on our website. There are many exciting projects happening to help us gather information on sizes, sex ratios, abundances, juvenile distributions and habitat quality—just visit our website for more information!



LOBSTER TAGGING

One really important study we need your help with is our tagging study. We will be measuring and tagging lobsters. When they are re-caught we can look at growth, moult rate, movement and abundance. If tagged lobsters are re-caught and not reported this can negatively influence our estimates of abundance so please get involved—if you find one of these tagged lobsters in your pots please contact Natalie Hold to report it so we can obtain measurements and other data.



Contact Natalie Hold (n.hold@bangor.ac.uk) or Jodie Haig (j.haig@bangor.ac.uk).

Tel: 01248 382850 web: fisheries-conservation.bangor.ac.uk



EUROPEAN FISHERIES FUND



Gwyddor Pysgodfeydd a Chadwraeth

Fisheries & Conservation Science



DEFNYDD CYNALIADWY O ADNODDAU PYSGODFEYDD YNG NGHYMRU

Arweinir y prosiect Cronfa Pysgodfeydd Ewrop gan y diwydiant pysgota a Phrifysgol Bangor. Mae tua 90% o lynges Cymru yn defnyddio llongau gyda'r glannau sy'n dibynnu ar gyflenwad lleol iach o rywogaethau masnachol i gynnal eu bywoliaeth.

Mae'r prosiect hwn yn ceisio darparu llwyfan i wyddonwyr a physgotwyr i weithio gyda'i gilydd i gasglu data a thystiolaeth wyddonol i sicrhau dyfodol cynaliadwy a phroffidiol i ddiwydiant pysgota Cymru.

Ceir gwybodaeth ar wefan y prosiect i bysgotwyr ac mae'n darparu mwy o fanylion am amcanion yn ogystal ag adroddiadau, fideos, mapiau a gwybodaeth arall: <http://fisheries-conservation.bangor.ac.uk>



RYDYM EICH ANGEN **CHI** I FOD YN RHAN O'R YMCHWIL PYSGODFEYDD

Ar hyn o bryd ychydig o wybodaeth sydd gennym am gyfraniad pysgotwyr cewyll fel gweithgaredd hamdden i'r ddalfa gyffredinol o grancod, cimychiaid, corgimychiaid a'r cregyn moch mwyaf. Mae'r wybodaeth yn hanfodol i reoli'r pysgodfeydd hyn yn gynaliadwy. I'n galluogi i ddeall cyflwr y stoc rydym angen amcangyfrif cywir o beth sy'n cael ei lano (ei ladd) a ble a phryd y cafodd ei ddal.

Gallwch gysylltu â ni drwy ffonio, e-bost neu drwy gofrestru ar ein gwefan. Mae nifer o brosiectau diddorol yn digwydd i'n helpu i gasglu gwybodaeth am feintiau, cymarebau rhyw, cyflenwad, dosbarthiad rhai ifanc ac ansawdd cynefin – ewch i'n gwefan i gael rhagor o wybodaeth!



TAGIO CIMYCHIAID

Un astudiaeth gwirioneddol bwysig, ac un rydym angen eich cymorth gyda hi, yw ein hastudiaeth tagio. Byddwn yn mesur a thagio cimychiaid. Pan gânt eu dal yr eildro gallwn edrych ar eu tyfiant, cyfradd bwrw eu cramen, symudiad a chyflenwad. Os yw cimychiaid wedi'u tagio yn cael eu dal yr eildro a chwithau ddim yn rhoi gwybod am hyn, gall gael effaith negyddol ar ein amcangyfrif o gyflenwad, felly dowch yn rhan o'r cynllun. Os cewch un o'r cimychiaid wedi'i dagio mewn cawell cysylltwch â Natalie Hold i roi gwybod iddi er mwyn i ni gael mesuriadau a data arall.



Cysylltwch â Natalie Hold (n.hold@bangor.ac.uk) neu Jodie Haig (j.haig@bangor.ac.uk).
Ffôn: 01248 382850 Gwefan: fisheries-conservation.bangor.ac.uk



EUROPEAN FISHERIES FUND

IMPORTANT NOTES

- The present project does not intend to restrict recreational fishers or charge them. The project aims to understand their contribution to the economy as stakeholders of the resource and to hopefully give them more and bigger bass to catch.
- All data provided by fishers will be strictly confidential and anonymous and will not be made available to other stakeholders.
- No fish will be killed specifically for this project. All biological samples (e.g. guts, gonads, scales, etc.) eventually provided by fishers will come from fish already dead, as harvested for direct personal consumption or for commercial reasons.

NODIADAU PWYSIG

- Nid bwriad y prosiect presennol yw cyfyngu pysgotwyr gweithgaredd hamdden na chodi arian arnynt. Bwriad y prosiect yw deall eu cyfraniad i'r economi fel rhanddeiliaid o'r adnodd a gobeithio i sicrhau draenogiaid mwy, a mwy ohonynt i'w dal.
- Bydd yr holl ddata a ddarperir gan bysgotwyr yn cael ei drin yn gyfrinachol ac yn ddienw, ac ni fydd ar gael i rhanddeiliaid eraill.
- Ni fydd pysgod yn cael eu lladd yn benodol ar gyfer y prosiect hwn. Bydd yr holl samplau biolegol (ee coluddion, gonadau, cen, etc.) a fydd yn y pen draw yn cael eu darparu gan bysgotwyr yn dod o bysgod sydd eisoes wedi marw, am y byddant wedi cael eu dal ar gyfer eu bwyta gan y pysgotwyr neu am resymau masnachol.

PLEASE PLAY YOUR PART

IN ENSURING BIGGER BASS

FOR FUTURE GENERATIONS IN WALES

CHWARAEWCH EICH RHAN I SICRHAU

DRAENOGIAID MÔR MWY I GENEDLA

THAU'R DYFODOL YNG NGHYMRU.



PRIFYSGOL
BANGOR
UNIVERSITY



Fisheries & Conservation Science
Group

Grŵp Pysgodfeydd a Gwyddorau
Cadwraeth

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Bangor University,
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LL59 5AB, UK

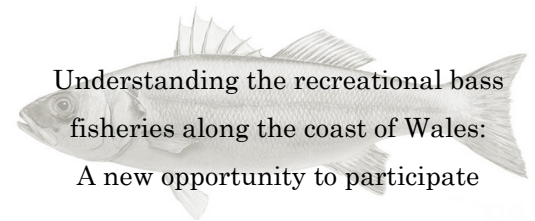
Ysgol Gwyddorau Eigion
Prifysgol Bangor
Porthaethwy
Ynys Môn
LL59 5AB, UK

Phone/Ffôn: 01248 382615
E-mail/E-bost: g.cambie@bangor.ac.uk

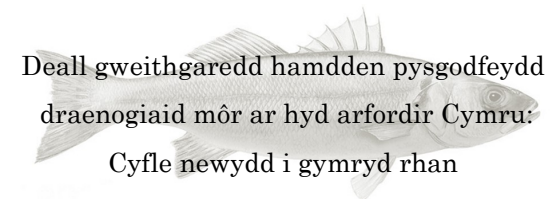


Fisheries & Conservation Science Group

Grŵp Pysgodfeydd a Gwyddorau
Cadwraeth



Understanding the recreational bass
fisheries along the coast of Wales:
A new opportunity to participate



Deall gweithgaredd hamdden pysgodfeydd
draenogiaid môr ar hyd arfordir Cymru:
Cyfle newydd i gymryd rhan

fisheries-conservation.bangor.ac.uk



The Problem

Fewer and smaller bass are being caught by anglers in Wales.

Effective management requires evidence.



Pictures/Illuniau Gareth Davies

What we would like to do

- Generate information on fishing effort exerted by commercial and recreational fishers.
- Record the data on captures from the personal log books of recreational anglers and commercial fishers. These time series data can provide valuable indicators on the state of the stock.
- Analyse samples of bass from the Welsh coast to determine ages, sexes, connections among areas.

- Update previous work by Bangor University's on the cash flow from recreational fisheries, particularly bass angling.

- Propose to anglers and angling clubs new methods and instruments for data collection using modern technologies (eg. web page for real-time data collection, applications for iphone, etc.).

How you can help?

Recreational sea anglers are part of the fishery management in Wales through the Inshore Fishery Groups.

By sharing information with us about your usual fishing areas, (past and present), your observations on catch trends and changes, how much you spend, the size (length/weight) of your captures, and any historic records.

We will collect biological samples (scales, fins, guts and gonads) of bass already dead from selected participants;

Interested volunteers have the chance to test the new technologies for catch and effort data recording.

Statistical analysis of this data, and that from commercial catches, will give us insights into the current state of the bass stock.

Why get involved?

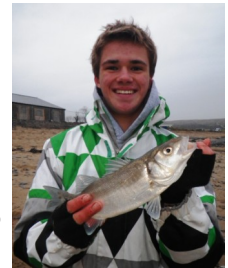
Because you care about bass and want to see more and bigger fish as a result of improved sustainable management of fishing in Wales.

Your knowledge will contribute to the evidence needed to develop future management strategies.

Other reward for your help will be regular updates from the project and the chance to develop continuing data collection as part of future monitoring for sustainable bass management.

The project is funded by public money and your input is essential. The project has the backing of the Welsh Federation of Sea Anglers. Recreational sea angling is recognised by Government as a key part of the Welsh Sea Fishery.

WFSA promotes angling interests to government and recognises the potential value of this project. The success of the project will be greater if it is based on contributions from as many anglers as possible.



Pictures/Illuniau Gareth Davies

Y Broblem

Mae llai o ddraenogiaid môr a rhai llai o faint yn cael eu dal gan bysgotwyr yng Nghymru.

Mae angen tystiolaeth ar gyfer rheoli effeithiol.

Beth ddymunwn i chi ei wneud

- Cynhyrchu gwybodaeth am y pysgota a wneir gan bysgotwyr masnachol a gweithgaredd hamdden.
- Cofnodi data ar y ddalfa o lyfrau log personol pysgotwyr hamdden a rhai masnachol. Gall y data cyfresi amser hyn ddarparu dangosyddion gwerthfawr ar gyflwr y stoc.
- Dadansoddi'r samplau o ddraenogiaid môr o amgylch arfordir Cymru er mwyn penderfynu eu hoedran, rhyw, cysylltiadau rhwng yr ardaloedd.
- Diweddarau astudiaethau blaenorol Prifysgol Bangor ar lif arian o bysgodfeydd gweithgaredd hamdden, yn arbennig pysgota draenogiaid môr.
- Cynnig i bysgotwyr a chlybiau genweirio ddulliau ac offer newydd ar gyfer casglu data gan ddefnyddio technolegau modern (ee tudalen we ar gyfer casglu data mewn amser go iawn, apps ar gyfer i-phone, etc.).

Sut gallwch chi helpu?

Mae pysgotwyr môr sy'n pysgota fel gweithgaredd hamdden yn rhan o reoli bysgodfeydd yng Nghymru drwy'r Grwpiau Pysgodfeydd Gyda'r Glannau.

Drwy rannu gwybodaeth gyda ni am eich ardaloedd pysgota arferol, nawr ac yn y gorffennol, eich sylwadau ar y tueddiadau a'r newidiadau mewn dalfeydd, faint rydych yn ei wario, maint (hyd/pwysau) eich dalfeydd, ac unrhyw record hanesyddol.

Byddwn yn casglu samplau biolegol (cen, esgyll, perfeddion a gonadau) o ddraenogiaid môr sydd eisoes wedi marw gan rai sy'n cymryd rhan;

Caiff gwirfoddolwyr sydd â diddordeb y siawns o roi prawf ar dechnolegau newydd ar gyfer cofnodi data'r dalfeydd a'r ymdrech.

Bydd dadansoddiad ystadegol o'r data hwn, a data o ddalfeydd masnachol, yn rhoi mewnwelediad i ni i gyflwr presennol stoc draenogiaid môr.



Pictures/Illuniau Roger Mortimer

Pam cymryd rhan?

Am fod gwahaniaeth gennych am ddraenogiaid môr a'ch bod eisiau gweld mwy ohonynt a rhai mwy, o ganlyniad i bysgota cynladwy drwy reoli gwell yng Nghymru.

Bydd eich gwybodaeth yn cyfrannu at y dystiolaeth sydd ei angen i ddatblygu strategaethau rheoli yn y dyfodol.

Gwobr arall am eich help fydd diweddariadau rheolaidd am y prosiect a'r cyfle i ddatblygu parhau casglu data fel rhan o fonitro yn y dyfodol ar gyfer rheoli draenogiaid môr yn gynladwy.

Cyllidir y prosiect gan arian cyhoeddus ac mae eich mewnbyn yn hanfodol. Mae gan y prosiect gefnogaeth Ffederasiwn Pysgotwyr Môr Cymru. Mae pysgota môr fel gweithgaredd hamdden yn cael ei gydnabod gan y Llywodraeth fel rhan allweddol o Bysgodfeydd Môr Cymru.

Mae Ffederasiwn Pysgotwyr Môr Cymru yn hyrwyddo diddordeb pysgota i'r llywodraeth ac yn cydnabod gwerth potensial y prosiect. Bydd llwyddiant y prosiect yn fwy os yw'n seiliedig ar gyfraniadau gan gynifer ag sy'n bosib o bysgotwyr.