

The Grower

Newsletter for the Association of Scottish Shellfish Growers

October 2011



ICSR Conference—shellfish revalued?



The Provost of Stirling, Fergus Wood, gave a real Scottish welcome to the International delegates at the first ICSR conference ever held in the UK this August. A reception was held in the Art Gallery of the University of Stirling to welcome the over 100 delegates from as far afield as New Zealand, USA and the Netherlands who had come to participate in “Shellfish Our Undervalued resource”. For more pictures and details see pages 9 and 10. Pictured above the Provost, from left Dr Liz Ashton, conference organiser, Dr Mark Spalding of the Nature Conservancy, keynote speaker for final day, Dr Janet Brown, conference organiser and on the right, Dr Melanie Austen, of MBL Plymouth, opening keynote speaker.

Photo Kerr Hunter

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ASSG Conference all set to go

Will there be a new champion for the Scottish shellfish industry this conference? That is, will there be a new holders of the trophies for best oyster and best mussel producer in Scotland after two years sway by Douglas Wilson and Andy Abrahams? That is just one of the many things that can be learnt at the forthcoming conference in Oban next week. Full details of the conference and the booking form are on the Association web site at www.assg.org.uk and further information is also in the Chairman's column on page 5. Don't miss the evening reception hosted by Neogen on Monday evening in Oban 18.30-20.30.

Advertising

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BEADS - an exciting new project

Jean-Pierre Lacaze

Worldwide, fish and shellfish consumption is continuing to expand, surpassing other animal protein sources such as beef and poultry. Within the marine food sector, aquaculture is rapidly growing in importance, contributing to approximately a third of fish/shellfish consumption.

In particular, shellfish aquaculture is a low environmental impact industry, which has greatly expanded across Europe over the past three decades, providing employment in many remote coastal locations. However, the development of shellfish aquaculture has been hampered by episodic contamination events directly affecting shellfish quality and consumption safety.

In Scotland's temperate inshore waters, filter-feeding shellfish can accumulate large quantities of naturally occurring potent algal toxins derived from phytoplankton. Consumption of such contaminated seafood can be harmful to humans and lead to intoxication, such as paralytic shellfish poisoning (PSP), amnesic shellfish poisoning (ASP) and diarrhetic shellfish poisoning (DSP). Shellfish production areas can also be severely disrupted by the presence of faecal material from human or animal sources in the water, which can lead to microbiological (bacterial and viral) contamination of shellfish.

To mitigate the negative impact of marine biotoxins, microbial contamination of shellfish, and parasitic disease (bonamiasis) specifically affecting the native oyster *Ostrea edulis*, a two year project (www.projectbeads.eu) was recently set up under the EC 7th Framework Programme (FP7). Formed by a consortium of small and medium-sized enterprises (SMEs) and research bodies, BEADS (Bio-engineered micro Encapsulation of Active agents Delivered to Shellfish) is a project that will seek to improve shellfish purification efficiency by delivering active agents to bivalve molluscs through microencapsulation.

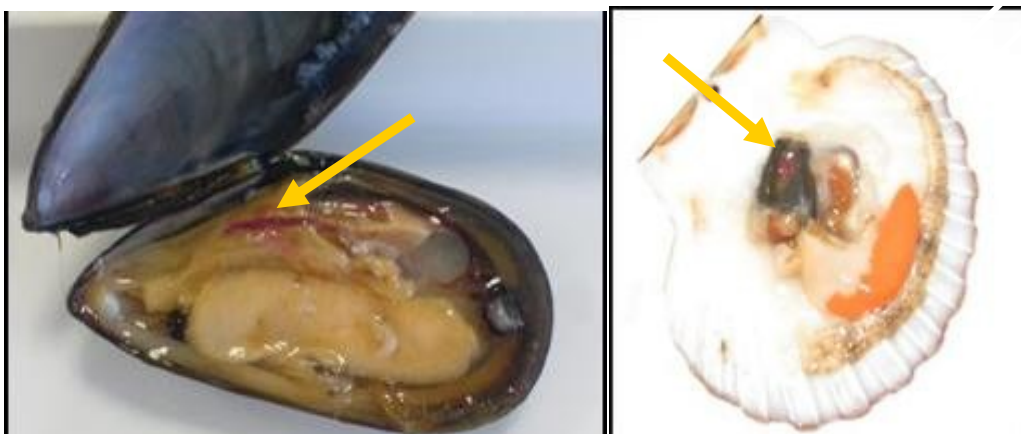
Early work carried out in a previous EC FP6 Collective Research Project (SPIES-DETOX) led to the development of a methodology using digestible polymeric gel microcapsules to introduce biological agents such as bacteria into filter-feeding shellfish (*Figure 1*). The microcapsules (less than 100 µm in size) are added to a water filled depuration tank to form a suspension on which the shellfish can feed on. Largely insoluble in water, the microcapsules break down in the shellfish digestive system and release the biological agent(s) which will then act on the target contaminants present.

Over the past ten years, research studies have shown that some marine bacteria are capable of degrading the shellfish toxins associated with PSP. Some of the work the BEADS project will focus on will be to



Jean-Pierre Lacaze is a member of the Aquaculture Environment Interactions group, part of the Aquaculture and Fish Health team at Marine Scotland Science.

As an analytical chemist, he has been involved in the development of methods of analysis for a wide range of marine biotoxins present in shellfish, phytoplankton and seawater.



*Figure 1
Pictured left*

pink coloured beads visible in the digestive tract of a mussel (left arrow) and king scallop (right arrow)

BEADS continued

isolate and characterise - using phenotypic testing and sequencing - marine bacteria from shellfish contaminated with toxins associated with ASP and DSP.

The toxin degradation ability of isolated bacteria will be investigated and the alteration of environment parameters, such as temperature and salt concentration during *in vitro* experiments, will be also looked at. It is hoped that through the BEADS project, a 'probiotic diet' of non-pathogenic toxin degrading bacteria will be developed and will successfully be delivered through microencapsulation directly to the shellfish digestive tract for algal toxin degradation.

Depuration is also an effective procedure used to remove many faecal bacterial contaminants from shellfish, but as currently commercially practiced, it is less effective at removing marine vibrios (e.g. *Vibrio parahaemolyticus*, *Vibrio vulnificus*) and viral contaminants such as norovirus and hepatitis A. Probiotic organisms can compete with pathogens for available space and nutrients on host surface and can produce small antimicrobial molecules.

Work in the BEADS project will focus on isolating and screening bacteria from commercial shellfish with potential activity against bacterial and viral pathogens. The most appropriate method for microencapsulation of selected bacteria will be established, while the use of microencapsulated bacterial diets to depurate shellfish contaminated with viral and bacterial pathogens will be investigated.

Another specific problem affecting parts of the aquaculture industry in Europe since the late 1970s relates to bonamiasis, a parasitic disease caused by *Bonamia ostrea* affecting the flat oyster (*Ostrea edulis*) haemocytes, which resulted in catastrophic mortalities and decimated this industry in several countries. Zootechnical prophylaxis and eradication attempts were some of the tested strategies that failed to fight against the parasite. The BEADS project will look at new mechanisms to mitigate the effects of the disease by targeting the immune response of the flat oyster and try to increase it using probiotics or immunostimulants via the use of microencapsulation.

During the second part of the BEADS project, tank based trials using live target shellfish will be completed and algal toxin degradation through the use of microencapsulated bacterial diets will be assessed. The ability of selected bacteria to increase the efficiency of depuration of bacteria and viruses from shellfish will also be carried out using laboratory tanks, then larger scale depuration plants belonging to some of the small and medium size enterprise (SME) involved in the project will be trialled.

The work progress will be reviewed through regular meetings and the project website will be used to share relevant information. Ultimately, it is hoped the BEADS project will successfully lead to the discovery of a range of non-pathogenic bacteria with the ability to degrade toxins associated with ASP and DSP and also presenting an activity against bacterial and viral pathogens in shellfish.

Successful identification of immunostimulants or probiotics effective at protecting flat oysters against *Bonamia ostreae* would also be a great achievement. The development of the microencapsulation technique that will be explored and tested for different shellfish is also a *sine qua non* condition to ultimately make BEADS a successful project.

Dates for your diary:

October 4th –5th 2011
Annual ASSG Conference
Corran Halls Oban

ASSG AGM
5th October 2011

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Seafood in Schools Project – get involved!

The ASSG is part of an exciting new schools project run by Seafood Scotland, which is encouraging teachers in Scottish schools to use seafood as a context for learning. The project has received funding from the Scottish Government for a one year pilot, and if successful it is hoped this will be extended.

“An important aspect of the project is a partnership approach with industry, and we are currently building up a list of shellfish farmers who would be willing to give time and energy to help children understand ‘Where shellfish comes from, How it gets to their plates, and Why it is good for them to eat’,” explained project manager Nicki Holmyard. “The three questions form the basis of the project and are being used by all sectors of the seafood industry.”

These key areas can be explored right across the curriculum, and might for example inspire projects on ethical trading, sustainability, healthy eating, marketing, image, economics or politics.

Involvement could mean providing product for children to taste, visiting a classroom to talk about shellfish farming, facilitating a class visit to your farm/onshore facility, or being creative and providing for example, a maths or economics class with facts and figures and asking them to work out forward projections for a farming operation.

Aims of the project include the provision of knowledge and understanding about the seafood supply chain in Scotland, from sea/source to plate, how the industry fits into the global picture, a greater appreciation of seafood as a healthy, sustainable food, and opportunities to choose, prepare and try different kinds of seafood.

A range of resources for teachers is currently being developed, including lifecycle wall charts and ‘exploring seafood’ crib sheets, with ideas of projects that teachers might like to consider with different ages of children and

in different areas of the curriculum. “We want the project to inspire pupils, get them interested in seafood, and help them understand what a dynamic and economically important industry we have,” said Nicki.

“ASSG is pleased to be associated with the project and I encourage all members to get involved. We need lots more children eating shellfish in Scotland, firstly because it is a healthy option, and secondly because their purchasing power in future can help our industry to grow,” said ASSG Chair Walter Speirs.

The first step is to register your interest with the project coordinator Catriona Frankitti, who will discuss opportunities with you. Tel: 0 7 9 6 8 2 6 6 3 0 1 or email cat@seafoodinschools.org. Further information can also be found on www.seafoodinschools.org.

SEAFISH Workshops Opportunity to express your views on Seafish

These workshops will be an opportunity for industry to speak directly to officials from DEFRA and the Devolved Administrations about Seafish, as they consider some fundamental changes to the way Seafish operates. These will be outlined in a discussion document due to be published by DEFRA in early October, once it has been signed off by Ministers.

There are three meetings scheduled to be held in Scotland. These will be in Glasgow at the Erskine Bridge Hotel, 18th October 9.30-13.00; in Edinburgh at the Norton House Hotel, 26th October, 10-12.30 and in Aberdeen at the Thistle Aberdeen Airport on 27th October 13.00-16.30.

These are open meetings but it would greatly help housekeeping arrangements if you could advise Tricia Jordan if you are planning to attend (T: 01472 252317, E: t_jordan@seafish.co.uk).

Harvesters' Own Results

Opportunity to provide additional water samples

Shellfish harvesters across Scotland now have the opportunity to submit their own samples to enhance the statutory monitoring programme for classified shellfish production areas. Harvesters' samples can supplement the official control samples taken by sampling officers and will be taken into consideration in the Food Standards Agency (FSA) annual classification review. Any increase in available microbiological data from a production area would have a beneficial effect on the stability of its classification and increase the knowledge of the microbial contamination trends in an area.

Annex II of Regulation (EC) No. 854/2004 permits the FSA as the Competent Authority to consider harvesters' own results to supplement those taken for the purposes of official controls in order to determine the classification and opening or closure of production areas. These results may also be used to trigger alert and investigate anomalous results. For a food business operator's (FBO) own results to be accepted, the Competent Authority must have designated the laboratory carrying out the analysis, and, if necessary, the sampling and analysis must have taken place in accordance with the FSA's agreed protocol. This requires an agreed sampling plan which is complementary to the official control monitoring programme: this is that the FBO's own testing is conducted under comparable conditions to official controls and is as representative as possible of the area considered. In addition, the protocol requires an audit trail that guarantees the authenticity and provenance of samples. The protocol can be found at:

<http://www.food.gov.uk/multimedia/pdfs/protocolcoliresultsjuly09.pdf>

The advantage of harvesters providing their own results is that they will boost the dataset to provide a more comprehensive evidence base to allow more informed decisions to be made on classification awards. There may be times when the sample results differ from those that the sampling officer collected. However the samples will not be taken at the same time, since this is duplication of effort and will not add value to the dataset.

This protocol demonstrates excellent partnership working between Harvesters, Local Authorities and the Food Standards Agency in Scotland

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Mussels alive update

The European project MusselsAlive aims to provide efficient technical solutions for optimizing the quality of live mussels. We are aware that European countries have different regulations, trade chains, practices and face different challenges. Currently there is at least a 20 % waste of commodity in the logistical chain between producer and processor. The aim is to reduce the loss of mussels from harvest to market by 35 %.

So far the project has mostly been focused on gathering information and preparing best practice documents. This has included site visits and sample collection and analysis from producers and processors in the partner countries (Scotland, Ireland and Norway). The project is now moving to the next stage which will look at trying to develop and optimise handling, holding and transport technology. Particular focus will be given to investigating depuration technology and regimes, the use of recirculation systems for holding and conditioning and mussel transport vessels.

Project strategy

Our approach is that everyone's knowledge is useful and needed. During October two important meetings are taking place, the ASSG Conference in Scotland and, the Irish Shellfish Association meeting, in Ireland.

Sara Barrento from Swansea University will attend both to represent the MusselsAlive project and is particularly interested in talking to mussel producers, processors and depurators. Questionnaires have already been sent to a number of ASSG members and Sara will be happy to collect any completed questionnaires but also to hear from other ASSG members. This will help the project team steer the project in a direction most beneficial to the industry.

Seafish launch new round of project funding

Speed essential for 9th October closing date!

Seafish announced on 7th September 2011 that its Industry Project Fund (IPF), worth up to £1 million is open for applications with innovative ideas for benefitting the seafood industry. For this round of applications Seafish is particularly interested in grant applications than cover communication activities aimed at the consumer, or an improved understanding of seafood.

Applications will be assessed on a value –for – money basis and must show measurable benefits to the seafood industry. Submissions that provide the greatest value to the widest industry audience will score most highly.

The application period opened on 7th September and closes at midnight on 9th October.

For full details of the scheme see

<http://www.seafish.org/processors/business-support/industry-project-fund>

Chairman's Column

Welcome to the autumn edition of the Grower. My contribution is going to be rather short this issue; there are just not enough hours in the day at the moment!

Preparations for our annual Conference are well under way, and thankfully registrations are creeping up. I would urge you to attend, booking and programme information can be found on our website at www.assg.org.uk. Many of the things I work on are going to be discussed at the Conference, so I do not want to steal the thunder of any of the speakers by updating you now. However, there should be favourable news on water quality from Joyce Carr, and Dominic Counsell will explain how Marine Protected Areas may affect our industry. The work done by SAMS on the Environmental Impact of Mussel Farming is not unrelated.

Our Annual General Meeting is also just around the corner, and I have my Chairman's report to produce for the meeting. I dusted down last years report, and felt that I could have really just changed the date rather than write a new one, as nothing has materially changed. We really need to discuss the future of ASSG at the meeting (again!), as the way the organisation is funded needs to be addressed. Depending on projects to fund the association is really not sustainable. I will elaborate further in my AGM report, and look forward to your input at the meeting.

You may be aware that Seafish won their court case, and are now back in action. It has recently been announced that the Industry Project Fund is open for bids, so if you have any need for assistance with a project please visit the Seafish website for further information. Still on Seafish, a series of meetings have been arranged by DEFRA to discuss with industry what they want from the Authority. If you would like to attend in either Edinburgh or Glasgow please get in touch.

The Scottish Government have now revealed their spending plans going forward, and Marine Scotland are going to have their



Walter Speirs, chairman of Association of Scottish Shellfish Growers

budget cut. I sincerely hope that this does not have negative implications for the Shellfish Forum, as this has been very useful for all connected with our industry. I will be lobbying everyone I can to ensure this does not happen, including the Minister, at every opportunity!

Recently I had a visit from a group of French teachers, and it was very apparent the different attitude to the shellfish industry in France. The desire to educate children about the sector, and also encourage them to consider a career in it was refreshing. The very simple question "why do we not grow more shellfish in Scotland?" is both thought provoking and complicated. We have the space, the market is expanding, do we lack ambition? Do you know the answer? Is so, please share it with me!

Another interesting event recently was the 'Shellfish, Our Undervalued Resource' Conference arranged by our Editor, Janet Brown, who I am sure will report on it elsewhere in the publication (*see pages 9-10, Ed*). So, all I would like to say is that compared to other countries in the world, we really do appear to undervalue our shellfish resource! How can we change that?

That will have to do for this issue, editors deadline is pressing, see you at the Conference.

Walter 26/9/11

Notes from ‘Down Under’

Doug McLeod

There have been no further reports of mass mortalities of Pacific Oysters from the Ostreid Herpes Virus (OsHV-1) in Australia since late last year, however the farmers in New South Wales, Tasmania and South Australia remain nervous about the potential for disaster. The spread of the virus would have a particular impact in Australia as *Crassostrea gigas* now represents 75% of national production (11,202 tonnes in 2009-10), with Sydney Rock Oyster (*Saccostrea glomerata*) output having declined by 26% over the past decade (3,605 tonnes in 2009-10).

As part of the industry’s efforts to prepare for the possibility of further mortalities, a delegation of growers from the three States most concerned is heading to France in October. The aim is to investigate how the regulators and industry have ‘managed’ the spread and general impact of the virus as well as how the research community has studied the outbreak and if any solutions have been found. Readers may recall from a previous ‘Down Under’ article on this issue that I mentioned the creation of a new growers’ organisation in France, emphasising spat collection from the wild as the solution to what they believe to be a hatchery source problem. If this were to be confirmed, there would be significant concerns for the Australian industry, as all production of *C. gigas* in Tasmania and South Australia, as well as an estimated 80% of New South Wales spat supply, is from hatcheries.

During a visit to Southern France in early September, I visited one of the leaders of the “Traditional culture, oysters born at sea” organisation, Annie Castaldo (*pictured right*) of ‘Ultra Marine’, a company based in Marseillan, on the Etang de Thau (*panoramic view shown below*) She explained that a small scale experiment of collecting natural spat in 2010 had proved successful, with good survival rates – this was considered a positive indication for their theory that the source of the problem lay in the hatcheries. Unfortunately, a larger scale effort in early 2011, with a good spat collection on oyster shell cultch (as shown in photo above), did not



Pictured above Annie Castaldo holding the bags of cultch put out to collect spat. These spat later get attached to cords to be suspended in the tideless Mediterranean.

Photo Doug McLeod

enjoy a similar success, and mortalities were around 85 – 90%. So the industry remains despondent and deeply concerned about the future – I’m not sure the Australian delegation will find much to cheer about during their visit to France, apart from perhaps an indication that their hatchery supplies are not to blame for the emergence of OsHV-1!



Right; panoramic view of Bouzigues in the eastern end of the Etang de Thau showing some of the extent of the oyster growing.

Photo Doug McLeod.

Shellfish revalued?

Janet Brown reports from “Shellfish Our Undervalued Resource” held in Stirling 23-27th August 2011

Photos courtesy of Craig Burton, Seafood Scotland

The theme for the 14th meeting of the International Conference on Shellfish Restoration was “Shellfish, our Undervalued Resource.” The theme was chosen to highlight the fact that shellfish are very far from being just something delicious and healthy to eat but a living resource that provides value in a number of different ways. The real question is to what extent can we hope to restore these services lost from the severely diminished shellfish resources worldwide?



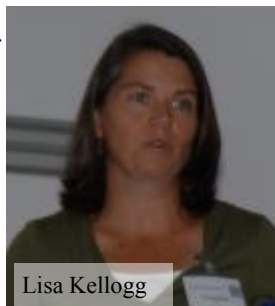
Antony Jensen, chair for session 1

Melanie Austen of MBL, Plymouth was the opening keynote speaker with “Ecosystem services – adding value to shellfish resources”. She first explained what ecosystem services were - the outputs from ecosystems from which people derive benefits, in terms of provisioning, regulating, cultural and supporting. Having explained the complexities and schemes that might be utilised for making these value estimates Mel finished her talk by scoring six different habitats, natural oyster reefs, natural mussel beds, cultured oyster beds, rope grown mussels, cable armouring and bare mud for the value of the ecosystem services they can provide. Shellfish in their different forms scored high.



Aad Smaal, chair for 2nd session

With subsequent speakers the differences between the UK approach to shellfish restoration and that of the USA became painfully apparent as papers addressed differences between restored and unrestored reefs, harvesting strategies and how to manage the harvesting so as to allow the ecosystem service benefits to be maintained. Lisa Kellogg of VIMS gave a graphic illustration of how restored reefs can remove nitrogen from the marine environment and showed that a third of this value is provided by the associated biota. She also pointed out that many of these benefits can be provided by shellfish aquaculture equally well.



Lisa Kellogg

While the first morning had provided a mainly USA

view the geographic focus moved in the afternoon to the Wadden Sea and Luca Van Duren of Deltares presented the evidence for the role of shellfish as ecosystem engineers. Norbert Dankers then introduced the programme on the Wadden Sea, the Mosselwad project, which is allowing an in depth study of the shellfish populations in all their complexity. The session concluded with Karin Troost (IMARES, Wageningen) who has done detailed work on the changes induced by the “ecosystem engineer and invasive species,



Luca van Duren



Norbert Dankers

Crassostrea gigas.” This is another complex topic since while biological invasions can threaten global biodiversity, she showed that in the case of *C. gigas* it can also contribute to ecological complexity and restoration of biodiversity. It is studies such as hers that are needed and it was a great pity that there were not more regulators and policy makers present at the conference.



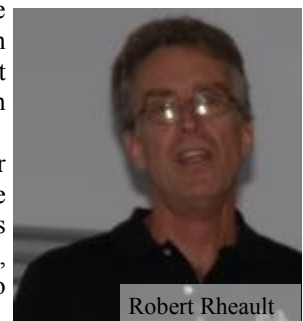
Karin Troost

The second day of the conference concentrated on the restoration and management of mobile shellfish, starting with two presentations from New Zealand (University of Otago) on the Blackfoot Paua (Tom McCowan,) and on traditional management in fisheries resources (Christopher Hepburn). The role of oyster reefs as habitat for fish was the subject of two subsequent talks demonstrating that there is a clearly defined benefit from the presence of oyster reefs that is not simply related to acting as a fish attraction device, but one of actually being important in recruitment and habitat provision for certain fish species.



Tom McCowan

The keynote speaker for Day 2 was the director of the East Coast Shellfish Growers Association (ECSGA), Robert (Skid) Rheault who



Robert Rheault

went into the attack immediately with the opening remark “Just because I represent industry doesn’t automatically mean that I’m wrong or that I don’t care about the environment.” His talk was so eloquent he was invited to write for this issue of The Grower on his topic. (see page 11).

Day 3 was devoted to oysters and thanks to funding from The Crown Estate and Seafish a number of UK shellfish farmers were invited. The keynote speaker, Mark Spalding gave a fascinating talk on the history of oysters worldwide and the



Mark Luckenbach

tale of their population decline – The Nature Conservancy estimated in a recent report that 85% of the World’s oyster reefs have gone (Beck *et al* 2009 www.nature.org/ourinitiatives/habitats/oceanscoasts/howwework/report.xml) He gave graphic illustration as how the USA tackled the problem with massive projects assisted by equally massive volunteer programmes – with funding from NOAA 2009-2011 of \$53,660,327. There clearly

is a lot the UK and Europe at large can learn from their experience, throwing money at the problem is not always the smart way and how do you measure the benefit? Are all reefs of equal value? Does one measure the extent, the biomass or the value of the ecosystem services provided? Mark provided evidence that not only would denitrification and better filtration be benefits but also considerable enhancement of fisheries, both fish and crustaceans.



Tristan Hugh Jones

Mark Luckenbach of VIMS spoke on “20 years of oyster restoration in the Chesapeake Bay USA;– what have we learnt and where do we go from here?”. He showed that there were real lessons to be learnt in terms of reef architecture and complexity, spacing and positioning but also alerted us to the value of proper monitoring so that lessons can be learnt more effectively.

Other examples followed of work in the USA while keynote speaker Sarah Culloty of University of Cork, addressed the disease problems of oysters. The conference concluded on an altogether upbeat note when final keynote speaker Gef Flimlin of Rutgers University (“feeling more and more Scottish” as he emerged complete with a “see you Jimmy” bonnet) gave the sort of talk for which he is already famed at the ICSR meetings, talking of his efforts with community programmes in shellfish restoration hidden as education programmes. Clearly his personality helps in building up large v o l u n t e e r



Gef Flimlin

programmes but he concluded that if we had intentions to work on restoration “Just do it”. Just the note the conference needed to end on.

The next ICSR meeting will be in Charleston, South Carolina, USA, November 14-17th 2012

The conference would not have been possible without the generous sponsorship of The Crown Estate, Marine Scotland, MASTS, SNH, Seafish, Fishmongers’ Company, SEPA SARF, and Stirling Council who jointly hosted a reception on the Wednesday evening and the organisers are immensely grateful for all this help. All the presentations are available as PDFs on the conference web site at www.aqua.stir.ac.uk/shellfish2011



Group photo on the final day dedicated to oysters

You can have your cake and eat it, too

Robert Rheault

Chairman of East Coast Shellfish Growers Association, USA

Recently I was invited to give a presentation at the International Conference on Shellfish Restoration (ICSR) held in August at the University of Stirling in Scotland. I wanted to discuss all the wonderful ecosystem services provided by wild shellfish populations, and to make the case that these treasured ecosystem services are substantially similar to those provided by shellfish aquaculture. Over the past twenty six years of farming oysters in Rhode Island I had made it my personal quest to help document these services in the peer-reviewed scientific literature to quiet the critics of my industry and clear the way for future applicants who were facing vocal opposition. In the US most applications to conduct shellfish aquaculture are opposed by affluent waterfront homeowners who would prefer not to look at muddy people working. Since they get little traction complaining about aesthetic impairment they resort to claims of navigational hazards or ecosystem destruction forcing the applicant to prove that his proposed farm won't have negative impacts.

Most of the talks on the first day of the conference were devoted to enumerating, describing and valuating the various ecosystem services provided by shellfish: how shellfish improve habitat for fish and provide food for sea birds; how shellfish improve water quality and remove nutrients from ecosystems under stress from eutrophication; and how they reduce turbidity, helping eelgrasses repopulate. Others had essentially given my talk for me, so I stayed up late to refocus my presentation so as not to put the audience to sleep.

Many of the attendees at the ICSR were professional restorationists, and some were making the argument that the economic value of natural shellfish populations as ecosystem service providers far exceeds their value as a fisheries resource. There is a growing consensus among restoration advocates in the U.S. and Europe that we need to establish protected areas and preserves to allow shellfish populations to recover to pre-industrial levels so we can recover the benefits of the ecosystem services they provide. While I accept that the economic argument is probably valid, I reject the obvious conclusion that stems from this calculation: that we need to protect our shellfish resources from commercial harvest in order to preserve and recover the services they provide. In my talk I made the bold suggestion that shellfish aquaculture allows us to have our cake and eat it, too. Aquaculture allows us to restore populations to historic levels and recover most of the ecosystem services we desire while still maintaining the societal benefits of a vibrant and highly sustainable fishery.

Humans have shown time and again that we are not very good at sustainably managing our fisheries, especially our shellfisheries. While there are a few examples around the world where shellfisheries are sustainably managed, there are countless more where the shellfish stocks have been fished to near extinction. Shellfish, being sedentary, are notoriously easy to catch and harvesters have developed some very efficient techniques. Collapsed shellfisheries are one of many examples that give credence to Garret Hardin's *Tragedy of the Commons*, the classic 1968 treatise on the inevitability of the destruction of commonly owned grazing lands. Hardin pointed out that when limited resources are shared by many, it is in each individual's self-interest to take as much of the benefits as fast as possible. And since no individual has responsibility to ensure that the resource is preserved for future generations, the resource is often destroyed in the process.

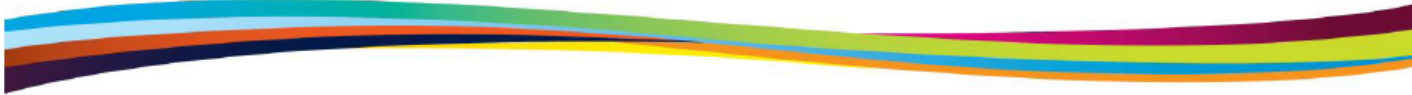
In my mind this is one of the best arguments, not for protection and preservation, but for aquaculture. When an individual has exclusive harvest rights through aquaculture leasing, that person has the economic incentive to invest in that resource, to plant seed, to protect the grounds from environmental damage and to maximize the profit and to ensure the sustainable harvest of that resource. In doing so, an aquaculturist will plant millions of shellfish annually and return the biomass to pre-industrial densities. At no cost to the government, aquaculture can help recover many of the ecosystem services that were lost when harvesters depleted the wild resource.



Bob Rheault was an oyster farmer and shellfish dealer in Narragansett, RI for 26 years. A few years ago he decided he was getting too old to work on an open skiff busting ice to harvest oysters, so he sold his farm and he now serves as the Executive Director of the East Coast Shellfish Growers Association. He is a passionate advocate for the shellfish industry and he claims he is better at lobbying than he ever was at farming.

He has a Ph.D. in Biological Oceanography and is an adjunct faculty member in URI's Department of Fisheries & Aquaculture. His research interests include documenting and valuating the environmental services provided by shellfish aquaculture and using nutrient credit trading as a means to limit coastal eutrophication.

Continued on back page



Seafood Scotland “Maximising Value” programme



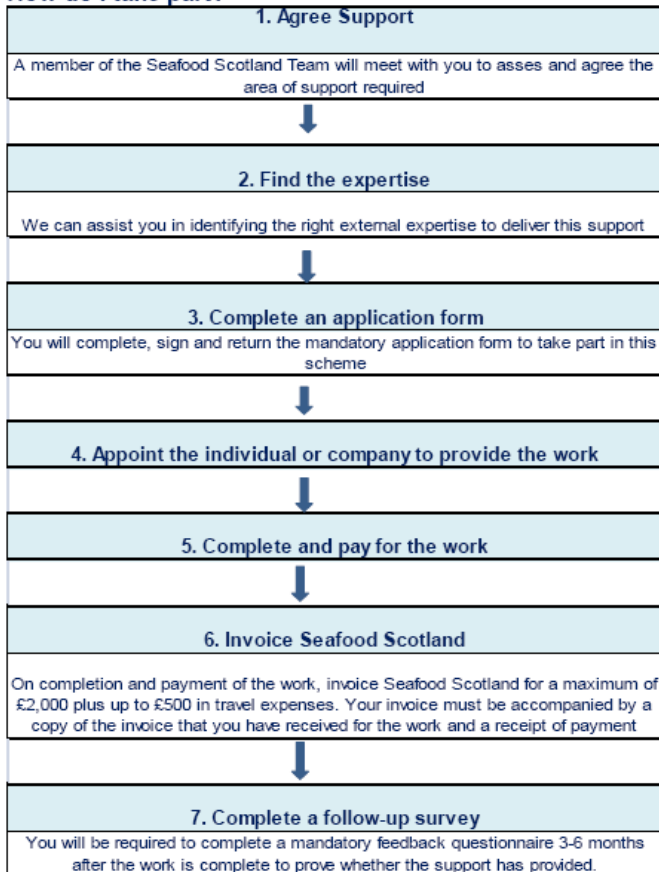
Seafood Scotland’s “maximising value” programme can assist you in improving efficiencies, reducing costs and raising standards.

What is available?

Up to £2,500¹ is available to Scottish fishing and seafood businesses that wish to engage external expertise to assist with:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Reducing energy costs. • Implementing performance measures. • Improving process capability. • Improving yield. • Delivering business improvement training. • Improving production planning process. • Coaching and mentoring managers in business improvement techniques. • Health and Safety improvements | <ul style="list-style-type: none"> • Reducing water usage. • Reducing work-in-progress. • Reducing product giveaway. • Using data to make informed decisions. • Value Added support • Capacity management. • SALSA , BRC² and MSC Chain of Custody accreditation • Waste management |
|---|--|

How do I take part?



Who do I contact?

<p>Lowland Scotland:</p> <p>Ian Land Business Development Manager</p> <p>T: 07876 035722 E: ian@seafoodscotland.org</p> <p>Highlands & Islands:</p> <p>Craig Burton Inshore manager</p> <p>T: 07876 035771 E: craig@seafoodscotland.org</p> <p>Seafood Scotland head office</p> <p>18 Logie Mill Edinburgh EH7 4HS</p> <p>T: 0131 557 9344 E: enquiries@seafoodscotland.org</p>

¹ £2,000 plus £500 expenses

² Support with BRC and SALSA accreditation is currently funded by Seafish



Cake and eat it continued from page 10

Firm substrate and vertical structure are replaced annually when the next crop is planted, so the fish habitat is restored and many of the other ecosystem services we treasure are recovered. Admittedly, the ecosystem services are not identical to those rendered by natural shellfish beds, but I maintain they are substantially similar in most respects.



The author, "Skid" Rheault with his specially designed 12 bag oyster cages, originally designed to foil "unregulated harvesting" from his growing site but also providing a perfect habitat for encouraging biodiversity in all forms. They now use these bags for first year of nursery and ongrow oysters on the sea bed.

Oyster shucking success

In the last issue of the Grower we promised to give the result of the Loch Fyne sponsored oyster shucking competition to be held at the Glasgow Riverside Festival in June.

Imagine my delight to hear that this was won by young Angus Vajk (22) who beat his own father, Hugo, to the prize. The prize was a trip to the World



championships in Galway since his time for opening the 30 oysters of 4 minutes 5 seconds was good enough to allow him to compete there. Unfortunately he did not repeat his success there! Angus is pictured above with Virginia Sumsion of Loch Fyne Oysters and part of his prize.

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