fsbi
An International Society for Fish Biology
Autumn 2017

Happy 50th! A fiesta of fun and fish at the Annual Symposium

Tim Gordon reports on a week of inspiring presentations, stimulating discussions, engaging workshops and high-octane socials as Exeter hosts a 50th Anniversary Symposium to remember.

The 2017 delegates at the end of a fantastic conference

The University of Exeter's beautiful Streatham campus played host to this year's summer symposium, a wonderful mix of conversation, collaboration and creativity on the theme of 'Understanding Fish Populations'. From the lecture theatre to the rounders pitch to the pub, all who attended enjoyed a dynamic and energetic celebration of the FSBI.

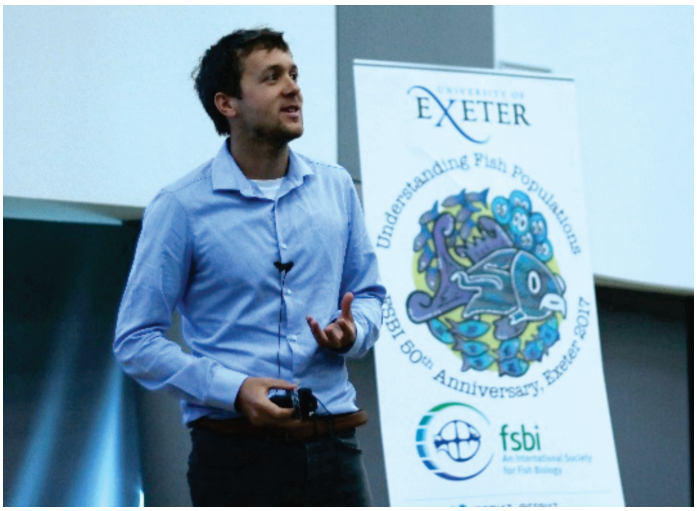
Fascinating plenaries set the tone

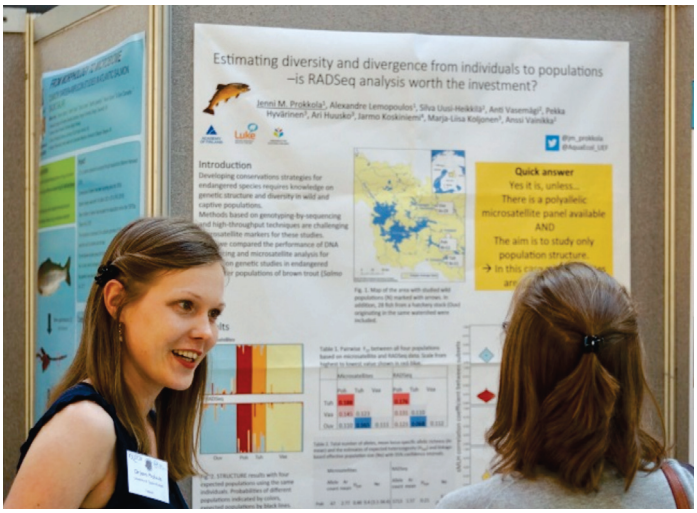
The conference opened with the invited Jack Jones lecture, this year delivered by Professor Charles Tyler at his home university. His informative and engaging presentation set the tone for the rest of the week, with his eloquent description of ecotoxicology and 'the feminisation of nature' being covered by over 200 media stories in 40 countries across the world.

A range of equally captivating plenaries punctuated every day of the conference, given by experts from all corners of the world. Topics ranged from an assessment of the future of global fisheries (Dr William Cheung, UBC, Canada) deciphering the mechanisms supporting collective animal behaviour (Prof. Iain Couzin, Max Planck Institute, Germany) to controlling invasive lionfish by spearfishing (Prof. Isabelle Côté, SFU, Canada); from designing marine protected areas based on modelled larval dispersal (Prof. Pete Mumby, UQ, Australia), developing ecosystem-based models for managing commercial fisheries (Dr Beth Fulton, CSIRO, Australia) to engaging with fishing communities in South America (Dr Joanna Alfaro, ProDelphinus, Peru)

Evidently spurred on by the example set by the plenary speakers, a fantastic programme of oral presentations and posters spanned genetics, ecology, modelling, biogeography, physiology, social science and ➤

Prof. Charles Tyler receives a gift for presenting the 2017 Jack Jones lecture





A series of excellent talks (left) and posters (right) made for a fascinating programme of fish science

policy, in both freshwater and marine systems. Four main subthemes – 'Biology of Fish', 'Fish in a Changing World', 'Valuing and Managing Fish' and 'Tools for Understanding Fish Populations' – provided structure to the week, and all session were well attended, provoking interesting questions and ideas that will form the basis of important work for years to come.

Work hard, play hard

The busy academic programme was complemented throughout the week by an equally packed social schedule. A photographic treasure hunt, morning jogging tours and evening trips to the city's finest pubs showed off various aspects of the best Exeter has to offer, and the evening BBQ and pub quiz were welcome chances to unwind and relax. Live music from 'The Land of the Giants' got everyone on their feet, with the fresh-from-Glastonbury local band inspiring some of the best dance moves fish science has ever seen. The mid-week rounders game was a hotly-contested affair, but ultimately proved that the symposium convener shouldn't give up his day job – a series of dropped catches and striking out for a duck being the only blemish on Dr Steve Simpson's otherwise perfectly-orchestrated week.

Celebrating a 50th in style

It wouldn't be a 50th Anniversary without a party, and the final night's banquet didn't disappoint. A fantastic three-course dinner in the plush surroundings of Exeter's Great Hall made for a fitting celebration of both an excellent week and 50 years of the FSBI. Medals were deservedly awarded to Prof. Sidney Holt (Beverton Medal), the FishBase Consortium (Le Cren Medal) and Prof. Nick Graham (FSBI medal) for their outstanding contributions to fish and fisheries science. They each gave gracious and inspiring acceptance speeches, either in person or passed on to be read out or played on video in their absence. Collars were loosened and hair let down as the evening moved on, with the fun only finally ending as the last pub in town closed its doors in the not-so-early hours.

A symposium seasoned with variety

The chances for collaboration and learning were more varied than ever at this meeting, with valuable workshops on scientific writing, career progression, and beating the dreaded 'imposter syndrome'

Action from the post-BBQ live band (left) and the fiercely competitive rounders match (right)

presented by senior academics during lunch times. Chances to expand existing work were further provided by generous prizes from VEMCO and Physalia – an acoustic transceiver for fieldwork, and a place on a scientific training course were awarded for the best 'Dragon's Den'-style research pitch and the best student presentation respectively. Award-winning photographer Jack Perks wowed delegates with a presentation of his beautiful photographs and videos as he launched an impressive book documenting all of Britain's freshwater fish species. Finally, a session of afternoon discussion groups allowed delegates from a wide range of backgrounds to combine ideas on the biggest issues facing fish science today, which will result in four horizon-scanning reviews to be published in the *Journal of Fish Biology* in the near future. Watch this space...

A packed and varied programme fuelled thought-provoking and engaging discussions throughout the week

Thanks to all, roll on next year!

In addition to FSBI funding, the conference was generously sponsored by APEM, Geospectrum, Physalia, Sole of Discretion, Star:Oddi, VEMCO, Wiley, and Young's; many thanks for their valuable support which funded the attendance of 34 Bursary students. Huge thanks also go to Dr Iain Barber, Dr Steve Simpson and the University of Exeter for organising and hosting such a fabulous week. Next year's symposium will be held at the University of East Anglia from 9–13 July, focussing on the theme 'The Sustainable Use and Exploitation of Fishes'. If this year's event is anything to go by, it will be a week not to be missed. We look forward to seeing you there!

(All photos by Dr Sulayman Mourabit).

Editorial

In 1995 the Society decided to create a medal to be awarded to a person who had made a significant contribution to some aspect of fish biology. This medal was first awarded to Ray Beverton. Sadly he died the same year on 23rd July 1995. Ray was President of the Society (1983-88) and was a major figure in fisheries science although he was also the first Secretary of the Natural Environment Research Council (1965-80). As a result of these distinctions the Society decided to call the first medal it established the Beverton Medal in memory of Ray's contributions to both the Society and the wider field of fisheries science.

Most will know that Ray's most influential work *On the dynamics of exploited fish populations* was co-authored with Sidney Holt. I have always thought that Sidney has not had the recognition that he should have been given for his work and at times I have pondered as to why this might have been. Sidney could not overcome seasickness and as Michael Graham, his director at Lowestoft insisted that all scientists should spend time at sea, Sidney had to move on after he and Ray completed their joint work on their book. After trying a few different options Sidney ended up at the UN Food and Agriculture Organisation in Rome. In the 1970s I remember attending a Committee of Fisheries session in Rome where all delegates were invited to a reception at the Portuguese embassy. Sidney was there, dressed in a very non-establishment style and with a glamorous wife and I could not resist introducing myself to one of the heroes of fisheries science. He was charming and as approachable as was Ray.

Whereas Ray remained a part of the British science establishment, eventually being elected to the Royal Society and becoming an influential player in British science, Sidney had removed himself from the clutches of the establishment and developed his own career in a very independent way. As a result, I think that the scientific establishment has shown up its prejudices in not giving Sidney the same accolades as Ray has had. Why for example is Sidney Holt not a Fellow of the Royal Society?

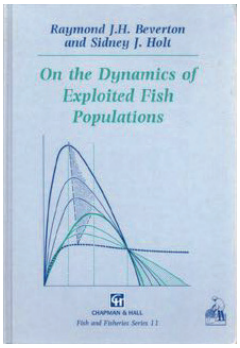
Ray died too early, he was only 73, but Sidney has had the good fortune to live twenty years longer and now at 91 the FSBI has been able to recognise his original and influential life's work by awarding him the Beverton Medal in the Societies 50th Anniversary year. Perhaps we should rename the Beverton Medal as the Beverton-Holt medal!

Paul Hart
Leicester, August 2017

Next deadline: 1st November

2017 Medallists

The Beverton Medal is awarded to Professor Sidney Holt. This medal is awarded to a distinguished scientist for a lifelong contribution to all aspects of the study of fish biology and/or fisheries science, with a focus on ground-breaking research. Sidney Holt worked with Ray Beverton in the 1940's and 50's at the Lowestoft Fisheries Laboratory. Their foundational book *On the dynamics of exploited fish populations* was written during this period and is widely regarded by fishery scientists as "the bible of fisheries science". In 1953, Sidney took a position with the Food and Agriculture Organization of the United Nations where he worked with international partners to address overfishing and concerns regarding global food security. Between 1960 and his retirement in 1979 Sidney diverted his attention to commercial whaling and achieved the recovery of baleen whale populations in the southern hemisphere. He worked as a representative of FAO, UNEP and the UN at the International Whaling Commission (IWC) and later he acted as a scientific advisor to the Republic of Seychelles and Italy (according to Beverton, Holt "saved the great whales in the early 1970s"). In addition to his work with the UN, Prof. Holt has held professorial chairs at the Universities of California Santa Cruz, of Rhode Island and of Malta, and a Senior Overseas Fellowship at St John's College, Cambridge. *On the dynamics of exploited fish populations* remains one of the top 10 most cited fish and fisheries references of all time. First published in 1957, it has been printed 4 times and amassed over 4,000 citations.



The LeCren Medal is awarded to the FishBase Consortium. This medal is awarded to one or more individuals who have made a lifelong contribution to all aspects of the study of fish biology and/or fisheries science, with a focus on conservation, training or public understanding of the discipline.

FishBase is a consortium of scientists, programmers and archivists that conceived, developed and continue to maintain FishBase, an online global biodiversity information system and database of finfish species (http://www.fishbase.org/). It is the largest and most extensively accessed online database for fishes worldwide. As of October 2016, FishBase included descriptions of 33,400 species and subspecies in almost 300 languages, 57,800 pictures and references to 51,600 works in the scientific literature. The site provides fisheries information to over 600,000 visitors every month. The FishBase database has been referenced over 6,500 times in 160 different journals spanning fisheries, agriculture, and business management. Data made available through FishBase has been instrumental in some of the most high-profile, and highly cited papers of the past three decades – including: Pauly et al. (1998) Fishing down marine food webs. *Science* 279: 860–863 [2309 citations]; Worm *et al.* (2006) Impacts of biodiversity loss on ocean ecosystem services. *Science* 314: 787–790 [1775 citations]; Pauly *et al.* (2002) Towards sustainability in world fisheries. *Nature* 418: 689–695 [1401 citations].

The FSBI Medal was awarded this year to Prof. Nick Graham. This medal is awarded to younger scientists who are deemed to have made exceptional advances in the study of fish biology and/or fisheries science in recognition of their achievements. Nominees must be under 40 years of age on 28 February of the year in which the medal is awarded.

Professor Nick Graham is Royal Society University Research Fellow and Chair of Marine Ecology at Lancaster Environment Centre, Lancaster University. Nick completed a FSBI-funded PhD at Newcastle University before moving to James Cook University (Australia) as a Research Fellow (later Senior and Principal Research Fellow). Nick's research tackles large-scale ecological and social-ecological coastal issues under the overarching themes of climate change, human use and resilience. His work assesses the long-term impacts of climate change on coral reef fish assemblages, fisheries and ecosystem stability, and how this can be incorporated into management action. Nick has published over 125 research articles which have been cited almost 10,000 times. In 2016, he was listed as an ISI Highly Cited Researcher.

David Ottewell from Natural England, Manchester, U.K reviews Jack Perks'

FRESHWATER FISHES OF BRITAIN

(Published by Reed New Holland Publishers, London, UK, 2016. Price £16.99. ISBN: 978-1-92151-777-8).

Into a crowded market place the author has chosen to pitch their own guide to British freshwater fish. Many would view this as a bold step considering the competition presented by a host of excellent alternatives offered by an array of fisheries scientists and ecologists, however, as in nature, the trick is to find your niche. From the hard backed front cover photograph onwards, the author has done exactly that. In some ways to review this book for the *Journal of Fish Biology* is doing it a disservice as the review may not be read in the context of the niche for which the book is designed to fill. This book is not a technical identification key, it is not a scientific appraisal of the intricacies of fish biology, what it is, is a gloriously illustrated celebration of our British freshwater fish community and to this end it excels.

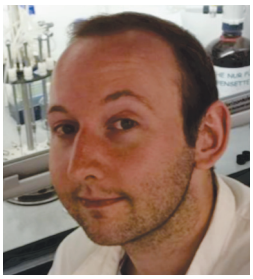
The author begins the book by noting that so often our freshwater fish community is, at best a naturalist's afterthought, at worst, a largely forgotten section lost in the depths of a British wildlife guide. He feels that this is unacceptable and I, for one, wholeheartedly agree. The book then moves on to a brief overview of some of the more interesting fish behaviours and how people can begin to view and interact with fish in their natural environment. From this point on the real strength of this book becomes apparent, it is the visual impact of the full colour photographs that draw the eye. For each fish species, a photograph, or series of photographs, normally underwater, is accompanied by a short descriptive text providing common and scientific name, maximum lengths and weights and a brief overview of the ecology, distinguishing features, breeding and habitat of the fish. Towards the end of the book sections are dedicated to a variety of facts and figures, fish conservation and a basic glossary. I was particularly interested in the section describing the methods used to capture the stunning photographs used in the book.

The richness of the illustrations is extremely powerful and represents the true strength of this book but it also hides some of the potential weaknesses. In addition to the descriptions of fish behaviour, I would have liked to see a basic illustration of both the internal and external morphology of a hypothetical freshwater fish. This may have greatly aided the learning and understanding of a reader new to the fascinating world of fish biology. It would be pointless and unfair to list individual technical inaccuracies, besides which, this would ruin the enjoyment of the scientific pedant, however, there is one issue that I feel I must comment on. The title of the book is "Freshwater Fishes of Britain" and, as such, it should explicitly state which are fully native and which are non-native, potentially invasive, imports. To give credit to the book, it is normally mentioned in text if a species is not native to Britain and certain species, such as topmouth gudgeon (*Pseudorasbora parva*), are singled out due to the risk they pose. Unfortunately it often understates the risk to the aquatic environment from many other introduced species. In addition to the risks posed by non-native species it would have been beneficial to place all of the non-native species into a separate chapter, in a similar manner to the way other types of fish are segregated in the book. It would also have been desirable to have more information on the natural distribution of species and where species are, or should be, locally absent. In addition to stating the dangers posed by non-native species, I feel that a brief paragraph on biosecurity should have been included, particularly aimed at anglers and individuals entering the aquatic environment to view fish. These omissions are common in texts that have anglers and the general public as a significant proportion of the target audience and represent an opportunity lost to further protect our aquatic communities.

Some of the negative comments above may appear unfair, to the point of churlishness, and in some ways I may be inclined to agree. If you are reading this review, it is highly likely that you are already a convert to the wonderful world of freshwater fish and you may also spot the negatives, however, this is to miss the overall purpose of this book. This beautifully presented book is your opportunity to demonstrate to others why you feel the way you do about fish and why they are both fascinating and worthy of more protection. It deserves a prime position in the centre of any freshwater ecologist's coffee table, however, be prepared for it to be thoroughly thumbed by the young and old alike and be ready for the questions that it is almost certain to provoke.

(Some of Jack Perks' work has been sponsored by the FSBI and Jack gave a presentation of his photos at the Exeter 50 the Anniversary conference. *Ed.*)

Research grant report



David Murray, who is at the University of East Anglia reported on work on 'Comparison of muscle tissue fatty acid compositions between adult diploid and triploid Atlantic salmon (*Salmo salar*)' which was supported by an FSBI research grant. The research was conducted at the WasserCluster Research Institute, Austria and NINA's field station, Ims, Norway.

Report summary

Farmed fish escaping from aquaculture facilities and hybridising with wild fish can have disastrous consequences for wild populations. Farmed triploid Atlantic salmon are reported to be sterile and their numbers and use within the aquaculture industry has become more widespread. However, despite their increasing popularity little is known about their biology. The present study seeks to understand what impact sterility may have on nutrient deposition in muscle tissues of triploid Atlantic salmon. Without gonadal development essential nutrients may instead be deposited in somatic tissues such as the muscle/fillet of Atlantic salmon. Both diploid and triploid salmon, from the same genetic strain, were held in identical aquaculture based facilities and fed identical quantities for two years. Despite the identical nature of their environments triploid salmon had significantly different muscle fatty acid profiles to diploid salmon, contained less lipids and less nutritionally important fatty acids, such as omega-3 and omega-6 fatty acids. These nutrients are essential for human health and the low amount observed within triploid salmon is concerning. Our current results suggest that despite sterility and lack of reproductive tissue development, triploid salmon are unable to accumulate and retain fatty acids to the same extent as diploid salmon. It remains unclear what the mechanism is preventing triploid salmon from accumulating lipids and fatty acids, however it is important, from a health and industrial perspective that this topic is researched further.

Travel grant report

Giovanni Romagnoni, University of Oslo, Norway used a travel grant to attend the 2017 ESSAS Open Science Meeting in Tromsø, Norway. He was able to present his work to a wide audience, and to organise and co-chair a workshop on interdiscliteriplinary research.

The 2017 ESSAS (Ecosystem Studies of Subartic and Arctic Seas) Open Science Meeting was held in Tromsø, Norway. This conference was a unique opportunity for me to interact and network with colleagues who work all around the Arctic and Subarctic areas. I presented part of my PhD work, focusing on coupled oceanographical-biological models of Atlantic cod larvae in the North Sea and the effect of larval drift on population structure. Moreover, I had the unique chance of organising and co-chairing a workshop as a side-event of the conference. The workshop attracted more than 20 participants, from a variety of disciplinary backgrounds, career stages, and geographical areas. The workshop focused on the problem of accomplishing real, effective interdisciplinary research. Based on personal experiences of the participants and through discussions and brainstorming, we identified some key steps for successful interdisciplinary science. While focusing on research on Arctic and Subarctic marine ecosystems as a case study, our work has potential to contribute to the general literature of interdisciplinary research, and we will consider developing it further toward publication. Organising and leading the workshop was a challenging but rewarding experience, which helped me to develop and to improve my organisational and leadership skills, a valuable asset for an early career researcher. I am grateful to FSBI for this opportunity, which, by allowing me to build and consolidate my professional network of contacts in my field and beyond and to increase the visibility of my research, constituted a stepping-stone in my career.

Alex Scott is retired. He spent his career in the field of fish steroids, but has spent the last few years trying to convince people that molluscs do not have the same endocrine system as fish (or humans, for that matter).

Generous funding from the FSBI allowed me to attend the 18th International Congress on Comparative Endocrinology in Lake Louise, Canada (4th to 9th June 2017) where I gave a talk on the Reproduction of the Bombay ➤

Duck. Several attendees tried to argue with me that this was not a duck but a dried fish, but I pointed out to them that it said on the top of the tin that it was duck and who were we to doubt the wisdom of our peers. I did admit that I have so far had difficulty in proving conclusively that the contents of the tins were reproducing, but that I had nevertheless been able to find statistical differences not only in oestrogen levels between tins but also in the expression pattern of some of the key genes for steroid biosynthesis– surely powerful enough evidence to continue researching this field?

Although I did in fact give a talk on why vertebrate steroids are found in molluscs (I argued that they were contaminants rather than endogenously-produced hormones), I think that my facetious talk would actually have been well-received at the meeting. In fact, it highlights a problem that came up quite a lot at the meeting. That problem is 'Nominative Determinism' (basically if it is called a duck, it must be a duck). Here is a real example. There is a protein in vertebrates that has a key role in reproduction. It is called the nuclear Estrogen Receptor (nER). When this receptor binds to estradiol in the cytoplasm of a cell in vertebrates, it moves into the nucleus and binds directly to DNA, where it triggers the production of mRNA molecules. A gene has been found in molluscs that has the same ancestry as this nER (i.e. it has a very similar, but not identical, DNA sequence). The protein formed from this gene in molluscs can also bind to DNA. However, it is unable to bind estradiol (or indeed any steroids). In other words, it is not an estrogen receptor. However, this fact has not stopped a large number of research groups (over 20 at the last count) from measuring the expression levels of this gene in invertebrates that have been treated with vertebrate estrogens (on the principle, as far as I can see, that if it is called an estrogen receptor, then that is what it must be!).

Another example (which was talked about at the meeting) was that of gonadotropin releasing hormones (GnRHs). These are short polypeptides in vertebrates (including fish, you will be relieved to hear) that are produced (mainly) in the brain and stimulate the release of gonadotropins from the pituitary gland. The gonadotropins in turn stimulate growth and sex steroid production by the gonads. Due to rapid advances in the sequencing of genomes, it has become apparent that peptides with the same genetic ancestry are also present in invertebrates. Unsurprisingly, these similar peptides are still referred to as GnRHs, which you will not be surprised to hear, leads many researchers to presume (on the basis of their name yet again) that they must also have something to do with the control of reproduction in these species, even though no one has ever definitively identified (I don't think they have!) either pituitaries or gonadotropins in any animals other than vertebrates. Recent genome analysis (presented at the meeting) does in fact indicate that the peptides form a separate 'clade' from the vertebrate GnRHs, and physiological studies indicate that their functions are in fact mainly non-reproductive (e.g. regulation of heart-rate in cockroaches). In my opinion, the problem of Nominative Determinism is serious (it costs money to measure hormones – and that money is wasted if it is the wrong hormones that are being measured). The problem has been inflated in the past few years by the increasing use of molecular biological methods. For instance, a popular new approach is to search through the large online databases of vertebrate genomes for the names of genes that contain words or parts of words such as 'andro', 'estro', 'prog' or 'steroid'. If such as gene is then found in an invertebrate genome, and even better, has been shown to be expressed differentially in that animal, then 'hey presto', it is presented as evidence that that animal must have a steroid-based hormone system the same as vertebrates. Among the genes picked up in such studies are 'hydroxysteroid dehydrogenases' which are part of a large family of reductase enzymes that have many substrates other than steroids, and 'progesterone receptors' that, like the estrogen receptors mentioned above, do not actually bind progesterone! In fact, a caveat can be attached to every single gene identified in such studies – the fundamental fact being that just because someone called it a duck, it does not mean it is a duck.

The problem is not so bad in fish research, because a lot of the hormones and enzymes discovered and originally named in mammals unsurprisingly have the same (or a very similar role) in fish. However, I am sure readers can think of a few examples!

Arne Jacobs attended the Evolution conference in Portland, Oregon from the 23-27 June 2017 where he presented his PhD research on the evolutionary history of parallel Arctic charr ecotypes in the Hamilton Award session. It also gave him the chance to listen to a range of fantastic talks by many of the world's leading and also upcoming scientists in evolutionary biology. One of the highlights of the conference were the many excellent talks on fish evolution, e.g. by Christopher Martin and his students on the evolution of extreme trophic morphologies in Caribbean pupfish. Furthermore, he got to meet many interesting people and made new connections that will certainly help me in advancing my career.

SAVE THE DATE!

2018 FSBI Annual Symposium –
"The Sustainable Use and Exploitation of Fishes"
Monday 9th – Friday 13th July 2018

Co-convenors: John K. Pinnegar and Martin Taylor
To be hosted by the Collaborative Centre for Sustainable Use of the Seas (CCSUS), which is a strategic alliance between the University of East Anglia (UEA) and the Centre for Environment, Fisheries & Aquaculture Science (Cefas).

Theme: *"The Sustainable Use and Exploitation of Fishes"*
The Symposium will encompass a broad range of scientific topics all of which fall under the umbrella of sustainable use of fishes. We encourage participation of both freshwater and marine researchers, and those working across the full range of topics from sustainable fishing techniques, population genetics, population dynamics, conservation targets and indicators, fish welfare and stress, international trade, ecosystem effects, innovative aquaculture technologies, traceability etc.

The symposium will be divided into the following four sub-themes:
1. Commercial fisheries. 2. Recreational fisheries. 3. Ornamental and aquarium fisheries. 4. Fin-fish aquaculture.

We would consider what 'sustainable use and exploitation' might mean for each of these types of system. We encourage contributions that examine basic fish biology, ecology, novel methods of data collection (including citizen science), experimental studies, modelling, genetics and genomics, and behavioural research.

Timing:
A call for abstracts will open in December 2017 (with a closing date in March 2018). Registration, via the FSBI and UEA websites, will open in January, with an 'early-bird' discount until 30th April and a closing date in May 2018.

Venue:
The symposium will be held on the University of East Anglia (UEA) campus in Norwich, within **The Enterprise Centre (TEC)**, Britain's greenest building and one of the most sustainable constructions in Europe (http://theenterprisecentre.uea.ac.uk/)

Information Desk

For all membership enquires (except subscription payments), including grant application submissions, please contact the FSBI office at:

FSBI, c/o Charity & Social Enterprise Department, Brabners, Horton House, Exchange Flags, Liverpool L2 3YL, UK

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Email Enquiries: grants@fsbi.org.uk

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admin@fsbi.org.uk Charities and Social Enterprise Department, Brabners, Chaffe Street, Horton House, Exchange Flags, Liverpool L2 3YL

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See http://www.fsbi.org.uk/membership/joining-the-fsbi/ for further information.

Secretary: Dr Ian Winfield

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