

## Changing of the guard. At the AGM on 26th July, Holly Shiels took over as President of the Society



Greetings FSBI members! It is my pleasure to write to you as your new Honorary President. I have been Honorary Vice-President for the past 2 years and will go on to be Honorary Past-President in July 2025. I want to start by thanking Colin Adams for his outstanding leadership as FSBI president. Together with his Past President Gary Carvalho, Colin made important changes to our society that put us on a clear and strong course for the future. But before delving into how I see the next few years unfolding, I thought I should tell you a little bit about myself.

I am a Fish Physiologist and have been an FSBI member since I arrived in the UK from Canada in 2002. My PhD investigated the impact of temperature on fish heart function under the guidance of Prof Tony Farrell at Simon Fraser University, British Columbia, with a focus on salmonids and scombrids. My research at the University of Manchester still centres around the impact of the

environment on fish cardiovascular physiology and how this affects fitness. I was on the FSBI council from 2009-2014, eventually chairing the Travel Grants committee before returning in 2021 as Honorary Vice-President.

As Vice-President I chaired the Communications Committee and worked with the officers, councilors and guests of council to progress 2 key areas for society. The first was to develop an Equity, Diversity, and Inclusion (EDI) strategy for the FSBI. Unlike most other learned societies, the FSBI does not have an EDI strategy, however, I am sure all agree that a diverse, equitable, and inclusive society benefits everyone. An EDI taskforce (which has recently become a standing committee) was formed made up of myself, councilor Katie Longo (Marine Stewardship Council, who is now the Chair of the EDI committee), our student representative on council Ada Fontrodona Eslava (University of St. Andrews, UK), and FSBI member Melanie Massey (Dalhousie University, Canada). Together with external consultants, and the backing of council, the committee initiated a review of FSBI activities to understand our current practices and to identify where barriers to EDI may exist. Considering the large number of grants and training initiatives, awards, conferences, publications, and communication platforms the FSBI runs, this has been a

large task. It has recently been completed and we hope to share the outcomes and suggestions from this review with membership in the coming months. We also hope to launch an EDI membership survey soon to give the FSBI membership a chance to directly participate in this process. Stay tuned!

The other key area I was involved with as Vice-President was a review of our education and outreach activities. Working with FSBI councilors Willie Yeomans (University of Glasgow, UK) and Catie Gutmann-Roberts (University of Plymouth, UK), we looked at what we do currently and asked where we want to go in this arena. This project was motivated in a manner similar to the EDI review: by a belief that increasing the number of people interested in the wellbeing of fish and the natural world that supports healthy fish communicates, benefits our society and the wider community. This exercise has culminated in a new Outreach Grant available to FSBI members. Please see the article by Catie Gutmann-Roberts (who is now the Outreach Lead within the FSBI) on this new funding stream in this current newsletter issue.

The future for the FSBI is bright. I just enjoyed the wonderful 2023 FSBI Symposium on Fish Habitat Ecology in a Changing Climate, organized by Anna Sturrock (University of Essex, UK) and

FSBI councilor Rui Vieira (Cefas/ University of East Anglia, UK). This was a truly stellar event with 200 registrants and a packed auditorium filled with excellent science and lively discussions over the 5-day meeting. A message that emerged across many of the sessions was the need for communication and cooperation between disciplines to make the informed decisions necessary to protect the future of fish. In this regard, the formalization of association between the FSBI with the Institute of Fisheries Management (IFM), an activity spear-headed by our Past Present Gary Carvalho and councilor Nigel Milner (APEM Ltd and Bangor University, UK), puts us in a great position to do this. Greater interaction between fish biologists and fisheries managers and scientists will expand the diversity of our communities, the reach of

our public engagement activities, and the power of our collective voice on matters of fish biology. Another piece of good news is that Anna Sturrock has agreed to help the FSBI develop a Sustainability Strategy as a Guest of Council. This is something Colin and I are very passionate about and we look forward to working with Anna to reduce the carbon footprint and enhance the sustainability of FSBI activities.

I want to sign off by thanking our outgoing Past President Gary Carvalho for his vision, dedication and extraordinary service to the FSBI over past 6 years. I also thank the outgoing FSBI councilors Rui Vieira, and Katie Longo (who is staying on as Guest of Council to chair EDI) for their service. I wish a warm welcome to the new councilors joining the FSBI: Faye Moyes (University of St Andrews, UK), Melanie Smith (Atlantic

Salmon Trust, UK), and David McKenzie (For Vice-President) (CNRS, Montpellier, France). Representation from fish-based charities and NGOs is key for continuing our drive to foster communication and cooperation between diverse sectors associated with fish and fish biology. I am particularly thrilled to be welcome David McKenzie to the Honorary Vice-President role. This is the first time in our society's history that we have had an officer situated outside of the UK. I look forward to working with David to increase our membership in Europe and to progress our status as an International Society for Fish Biology.

Sincerely,  
Holly A Shiels  
Honorary President  
Professor of Integrative Physiology  
University of Manchester, UK

## FSBI conference 2023 at the University of Essex. Organisation lead by Dr Anna Sturrock (U of Essex) and Rui Vieira (Cefas)

With a delegate total of 200, the Conference with the theme *Fish habitat ecology in a changing climate*, must be one of the largest FSBI symposia for a long while. Possibly the broad topic and the release from covid restrictions, stimulated people to attend.

All the talks were held in the Essex Business School, housed in a building made from wood and with grass on its roof. As with Wivenhoe House Hotel where I stayed, the good insulation of the building meant that rooms were rather warm despite the cool outside 'summer' temperatures.

The programme consisted of 88 presentations given between Tuesday morning and Friday lunch. There were seven keynote talks with the Jack Jones lecture being

given by Steve Campana from the University of Iceland. Most of the talks were 10 mins with a smaller number of three minute speed talks. Given the short time for each talk, speakers kept to the brief amazingly well. This coupled with good chairing, meant that sessions did not go over time to any serious degree. A possible reason for this was that questions were kept to a five minute slot at the end of each session.

The range of talks was enormous as one might expect from the number given. Steve Campana's talk in which he discussed his work using cod otoliths to extend information on the Icelandic cod population back to the Viking settlers was amazing. Sessions were split into

six themes: Understanding and predicting future fish distributions, Fish and habitat management, Protecting and restoring critical habitats, The role of fish in food webs, One health and Fish movement and connectivity.

The One health session was a departure from fish ecology in that the keynote, given by Baukje de Roos on Fish as food – how much do we have, what do we eat and what should we be eating? addressed the issue of fish as human nutrition. Professor de Roos is this year's Buckland Professor ([https://en.wikipedia.org/wiki/Buckland\\_Foundation](https://en.wikipedia.org/wiki/Buckland_Foundation)) which is a position funded by a legacy from Frank Buckland, a Victorian fish enthusiast who did much to begin the process of







gathering good data on British fish stocks. He was also renowned for tasting as many fish species as he could and more besides! In that sense this year's Buckland lecture bridged the gap between fish as objects of ecology and fish as sources of human nutrition. A further discussion of this was given by Professor de Roos' post-doc Anneli Lofstedt who spoke about the maximum nutrient intake that can be obtained from mackerel in different seasons.

Three presentations were from ECRs who had been recipients of the FSBI's Postdoctoral International Travelling Fellowships. This scheme came into force just before the Covid outbreak which of course hindered its purpose. The three people, Casey Benkwitt, Katie Dunkley and Nildeniz Karakus have contributed reports that are published in this Newsletter. Their work has been carried out with determination in the face of considerable difficulty.

Poster papers were housed in a different building from the talks. Although the evening meal was served in this building on Monday and Tuesday evenings, the posters were too far away from the Business School for delegates to be able to nip across to see the posters during the day. The so-called ice-breaker reception on the first night was in the Wivenhoe House Hotel, a great location with access to a beautiful garden. A barbeque was held on Wednesday evening. These are always a lottery in the English climate and

delegates were subject to a rather cold and windy evening with rain later.

On Thursday evening delegates were taken by bus to Prested Hall, some 10 miles or so to the west of Colchester for the conference dinner. This was held in a large marquee set out with 17 round tables. The food was excellent and afterwards the LeCren Medal was presented to Nicholas Dulvey, the FSBI medal to Rajeev Raghavan and the Huntingford medal to Sofia Graça Aranha. Unfortunately, Nicholas Polunin, who is this year's recipient of the Beverton medal could not attend. After the medal presentations, the delegates were entertained by an excellent talk by Chris Howard of Silverback Productions. The company makes natural history

films including the recent *Wild Isles* series shown on the BBC.

The Society's AGM was held on Wednesday at which Holly Shiels took over as President, Colin Adams became Past-President and Gary Carvalho finished his presidential term. The meeting voted in three new Council members including David Mackenzie, who becomes Vice-President together with Faye Moyes and Melanie Smith.

Anna and Rui, together with their many helpers on the scientific and local organising committees should feel very proud of themselves for putting on a well organised and stimulating week of talks and discussions.

**Paul J. B. Hart**



Rui Vieira, Rajeev Raghavan, Colin Adams, Sofia Graça Aranha, Nicholas Dulvy and Anna Sturrock at Prested Hall.



# Reports from researchers supported by the new FSBI Postdoctoral International Travelling Fellowships (PITF)



**Katie Dunkley from the University of Cambridge received a Postdoctoral International Travelling Fellowship (PITF) to study how cleaning interactions change across a species diversity gradient.**

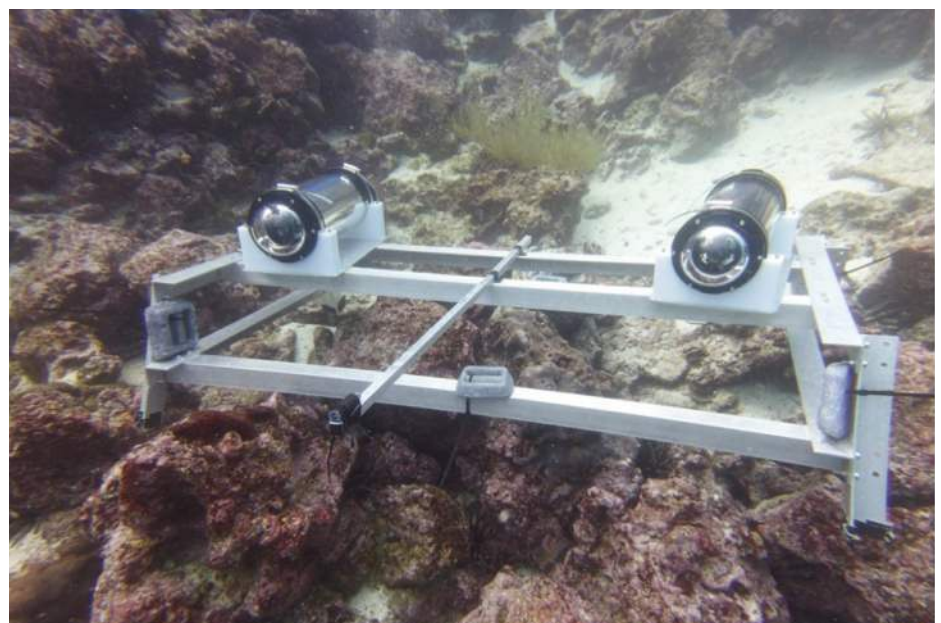
Mutualistic cleaning interactions, where a cleaner fish removes parasites and debris from the body of another “client” fish, can promote the health and biodiversity of reef environments. For example, the presence of cleaners can attract fish to reefs, while the cleaning service provided promotes fish health. These cleaning interactions, however, also rely on this biodiversity to successfully function in the first place. Because many cleaner fish are facultative, part-time cleaners, if there are few clients on the reef, cleaners may invest less in cleaning and instead focus feeding on other food sources. Such a loss of cleaning could further impact the health and abundance of client species. This feedback loop is particularly worrying,

given that human induced actions, including climate change and overfishing, are leading to large-scale losses of habitat and associated communities. Such biodiversity losses may ultimately alter the frequency and strength of mutualistic cleaning interactions.

To better predict the impact of species loss on cleaning interactions, we need to know how cleaning patterns change along naturally occurring species abundance and diversity gradients. The cleaning interactions on the reefs of the Galapagos provided an ideal system to test this. Galapagos reefs host the highest functional fish diversity in the world and have high natural variation in their associated fish communities. This means that neighbouring reefs differ in their number and abundances of fish species with the same cleaner and client species found in different mixes across these reefs. This variation creates the natural gradient in fish abundance and diversity that is needed to understand how cleaning patterns

change with the diversity and abundance of both cleaners and clients.

For this PITF project, I asked how mutualistic cleaning interactions change as a function of the number and abundance of fish species on Galapagos subtidal reefs. To capture cleaning interactions across the gradient of fish abundance and diversity in the Galapagos, I first needed to develop underwater cameras that can record long-term continuous footage of fish species and their interactions. Cleaning interactions vary across time and space, and with client species. Therefore, to capture rarer interactions and full behavioural repertoires, cameras needed to run continuously for longer than the standard battery life of existing underwater video cameras (e.g. > 1.5 hours). Additionally, as I am using automated methods to quantify cleaning interactions from video, we require video data from which we can quantify three-dimensional (3D) positional data. Such data can be captured from multiple cameras



arranged in stereo, allowing us to infer individuals' size, orientation, position, and movement in 3D space. With the help of engineers, I therefore designed and built an inexpensive (£1337 total cost per camera rig), open-source, simple to use, underwater stereo camera rig, which can continuously record species and their behaviours/interactions in high resolution (1080p and 30 frames per second) and in 3D over multiple days.

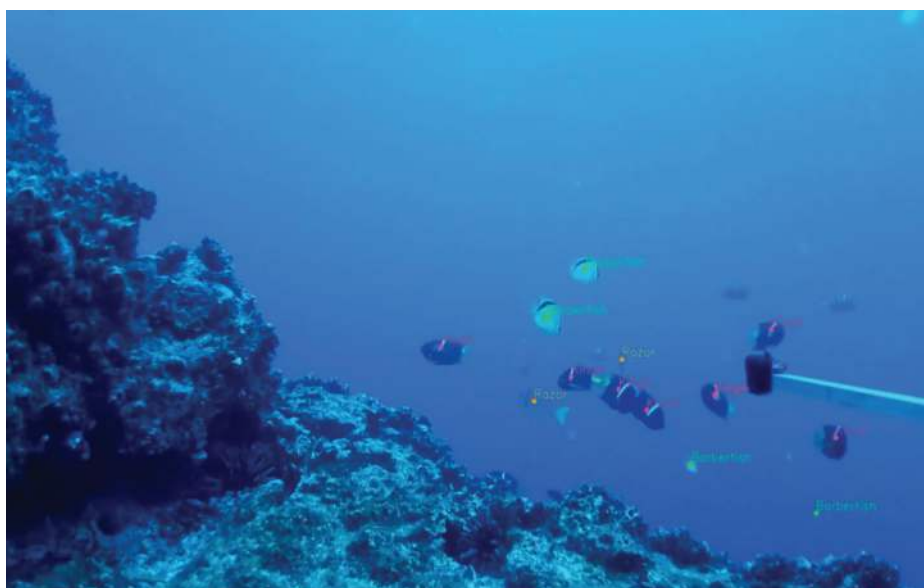
In March 2022, armed with 100kg of camera and diving equipment, I headed out to the Galapagos to meet, and work with, Dr Inti Keith and other marine scientists from the Charles Darwin Foundation. Over the course of 12 weeks, we deployed the stereo cameras across Galapagos' fish diversity gradient, capturing underwater video data across the coral reefs of the North, and the colder reefs in the West and South. Together, we collected – 480 hours of underwater footage capturing common part-time cleaner fish like the barberfish (*Johnrandallia nigrirostris*) and their interactions with client fishes.

While video data offers numerous advantages for recording species presence and their behaviours and interactions, manually analysing 100s of hours of it to quantify such fine-scale data presents a mammoth task. Fortunately, machine learning methods are now being increasingly used to analyse ecological data, and such methods now offer the ability to identify species, count individuals, and track their movements across time and space. Therefore, with the support and guidance of Dr James Herbert-Read from the University of Cambridge, I am currently training supervised machine learning models to recognise individual cleaner and client species from video. Ultimately, I aim to use machine learning to identify common Galapagos fish species, like the barberfish, king angelfish

(*Holacanthus passer*) and razor surgeonfish (*Prionurus laticlavus*) and use these models to quantify their abundances and track their movements across collected video. Because video data were collected with two cameras arranged in stereo we can ultimately project individual fishes two-dimensional tracks into 3D space. Using these 3D tracks, we can then compare postural and movement measures of cleaners and clients, like relative distance, orientation, and speed, from which we can infer

behaviours and interactions. For example, a client that is close to a cleaner, moving slowly and is unaligned with it is likely to be involved in a cleaning event. While one fish swimming quickly after another could be a chase. Hence, I aim to automatically infer behavioural interactions from the 3D trajectory data collected.

While I still need to optimise machine learning models to analyse the videos, preliminary results from *in situ* species abundance and diversity



Machine learning models identifying three Galapagos fish species from collected video data. Barber fish – *Johnrandallia nigrirostris*, king angelfish – *Holacanthus passer*, and razor surgeonfish – *Prionurus laticlavus*.



Stereo camera rig behind barberfish (*Johnrandallia nigrirostris*) and creolefish (*Paranthias colonus*).



surveys and cleaning presence/absence surveys, suggests that the presence of cleaning is not likely to vary as a function of the number and abundance of client fish species. Cleaning behaviour in the Galapagos appears to be difficult to predict – just because the cleaners are present does not mean they are actually cleaning. *In situ*, it is difficult to predict, for example, which reefs and areas will have cleaning and which will not, which made setting the cameras particularly challenging during fieldwork. This raises the question: What factors are driving these fish to clean or not to clean? Is it the availability of other food resources? The current? The complexity or other features of the habitat? Or the presence and behaviour of particular client species? By combining a number of data sources, like 3D reefs models and ecological monitoring data, we aim to unravel the factors that drive cleaning behaviour in Galapagos' part-time cleaners. Our goal is to fathom what truly motivates these fish to clean and to gain a deeper understanding of the role these cleaner fishes play in reef communities.

I am hugely grateful to the FSBI for this Postdoctoral International Travelling Fellowship opportunity that allowed me to pursue this research.

**Dr. Casey Benkwitt, (Lancaster University) reports on her FSBI Postdoctoral International Training Fellowship (PITF).**

I used the fellowship to conduct field research in Tetiaroa Atoll, French Polynesia and to collaborate with researchers at the University of California Santa Barbara, USA. Receiving the PITF in Spring 2020 meant overcoming repeated challenges to international travel, but after many covid-related delays and thanks to the continued support from FSBI, I am excited to report on some



outcomes from my fellowship. My project focused on how natural nutrient inputs from seabirds influence herbivorous fishes on coral reefs. Herbivorous fishes are ecologically important due to their role as algae grazers, yet changes in nutrient regimes can modify their effects. One way that humans have altered nutrient regimes is by disrupting natural nutrient pathways, which coral reefs rely on to thrive. For example, seabirds bring nutrients from their feeding grounds in the open ocean to island and coastal ecosystems when they return to roost and breed. These nutrients act as a natural fertilizer, benefiting island and coral reef ecosystems alike. However, the introduction of predatory rats to islands has caused large declines in seabirds and their associated nutrient subsidies. During this fellowship, I tested how functionally-important herbivorous fishes respond to, and modify the effects of, seabird-derived nutrients on coral reefs.

Tetiaroa is a small coral atoll near Tahiti, consisting of 12 motu (islands) that had a range of different rat invasion histories and thus a range of seabird densities. Working with the Tetiaroa Society and other visiting researchers, we collected algal samples around the entire atoll lagoon to determine how seabirds influence the nutrient content of algal food resources. We found a clear positive relationship between



Red-footed boobies in a nest on one of the motus in Tetiaroa.



View across the Tetiaroa lagoon, with one of the research station boats.

seabird biomass and the amount of seabird-derived nutrients present in algae, confirming that seabirds transport nutrients to Tetiaroa's coral reefs.

We then determined how seabird-derived nutrients influence herbivore and benthic communities, by conducting underwater visual surveys using snorkel. Preliminary results suggest there are differences in herbivore and benthic community structure across the gradient of seabird-derived nutrients within the Tetiaroa lagoon.

Finally, we quantified herbivorous fish foraging behaviour using both *in situ* observations and remote underwater videos. Briefly, we followed surgeonfish and recorded



Screenshot from one of the videos, showing herbivorous parrotfish and surgeonfish feeding on our algae assay.

their behaviour, including the number of bites they took and the distance travelled between bites. For the video assays, we set out algae-covered rocks and filmed for 1-hour intervals, and measured the proportion of algae removed during that time. Preliminary results from both methods suggest that herbivores do alter their foraging behaviour in response to seabird-derived nutrients in their algal food resources. We believe these changes may underpin demographic responses in herbivores and drive fine-scale changes to the reef benthos in response to seabird-derived nutrients.

In total, we collected and analyzed 683 algae samples, counted fish and benthic organisms along 50 transects each 30 m in length, observed 104 individual surgeonfish, and conducted 108 video assays.

In addition to funding my research project, the PITF has enabled me to form connections with an international team of researchers. The Tetiaroa Society eradicated rats from the entire atoll last summer, and I am now working with both terrestrial and marine researchers to track how rat eradication affects atolls at scales ranging from microbes to entire ecosystems. The PITF also funded my visit to UCSB where I worked with Dr. Deron Burkepile and his community ecology lab to get

valuable insights into my research and form lasting collaborations. I recently presented these results at the FSBI Symposium at the University of Essex in July, and look forward to finishing the data analysis and writing for publication.

### **Nildeniz Karakus used her PITF to ask the question: How co-invading parasite dynamics and eradication programmes drive disease emergence?**



Invasive alien species (IAS) are second only to habitat loss in their global threat to biodiversity, with their impacts ‘immense, insidious and usually irreversible’. In Europe, there are over 12,000 introduced alien species, of which 11% are invasive and causing ecological impacts. Eradication, the ‘complete and permanent removal of a population of invasive alien species by lethal or nonlethal

means’, is integral to legislation and policy on IAS. While recent studies in terrestrial environments suggest eradication measures can remove IAS and restore populations of suppressed native species, similar studies completed in freshwater environments are equivocal, with large knowledge gaps remaining on its efficacy. The complexity of managing IAS is elevated when it hosts novel, generalist pathogens that infect native fish. For example, the IAS topmouth gudgeon *Pseudorasbora parva* is the asymptomatic carrier of the generalist pathogen *Sphaerothecum destruens* (itself an IAS) that can cause high, chronic mortalities in susceptible native fishes. Since 2005, a programme of *P. parva* eradication from ponds in England has been used to prevent its invasion and halt *S. destruens* spreading to native fish. However, a recent epidemiological model predicted that following *P. parva* eradication, *S. destruens* still persists in neighbouring fish communities due to its initial rapid transmission to susceptible native fish prior to eradication, especially in areas of river habitats of reduced flows. Our research aim here is to quantify how IAS eradication impacts the dynamics of their co-introduced pathogens in the native fish communities using *P. parva* as the IAS host, a highly invasive freshwater fish originating from Eastern Asia that was introduced in Europe in the 1960s. The study was completed on two waterbodies—the River Test (Southampton, UK) and the River Severn (UK). Both rivers have had hydrological connection to eradicated *P. parva* populations. Sample collection was completed on the Test River in October 2022 by targeting nine different locations and sampling across the entire length of the river. The River Severn was sampled with water samples collected from 15 locations along the river across two seasons ➤





Topmouth gudgeon *Pseudorasbora parva* (Temminck & Schlegel, 1846).



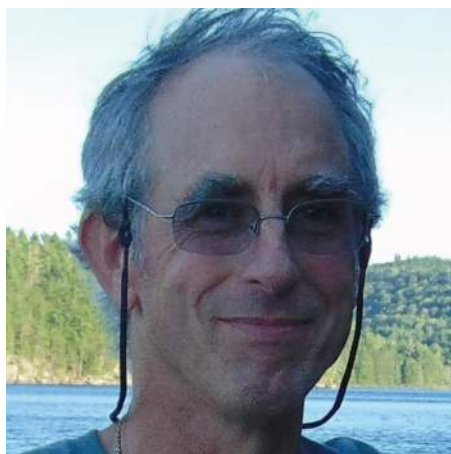
River Test (Hampshire, Southampton).

(Summer and Autumn 2021). Both samplings were conducted in major urban areas, weirs and neighbouring waterways. Three replicate water samples were collected from mid-river at each location and individually filtered immediately on site using Sterivex filters (~1L). Environmental DNA and Real Time PCR (RT-PCR) method were used to detect *S. destruens* DNA targeting the 18S rRNA gene. Following IAS host eradication, the environmental persistence of *S. destruens* was observed in both rivers. Positive eDNA detection ranged between one and three samples at a single sampling event per location, and the percentage of positive RT-PCR replicates ranged between 22%

and 100%. The prevalence of *S. destruens* DNA in the environment was determined in the Test River as 33.33% and for the Severn River it was 46.6%. With the parasite now persisting in both rivers, transmission is predicted to occur within the native hosts, potentially resulting in the parasite becoming more specialised in its host specificity and increasing its virulence through higher within-host replication rates. To understand that, as a follow-up work, we should evaluate the pathological impacts on native fish hosts and infection levels between fish infected with specialist and generalist strains.

## Gordon Copp, who died recently at age 67 years,

will need no introduction to many FSBI members due to his extensive collaborative network and/or his work as treasurer of the Society for 8 years (2005-2013). After suffering periods of illness over the last decade, he passed away on Saturday 8th July, leaving his wife Elisabeth and son Ashley.



Gordon enjoyed a full and varied career, which continued right up to his passing. His research career started in chemistry and biotechnology before he moved into fish biology by completing his PhD in 1987 at the Université Claude Bernard in Lyon, France, on the

reproduction and nursery sites of fishes in the River Haut-Rhône. This was followed by a post-doctoral position at the Institute of Freshwater Ecology, where he worked under the supervision of Dr Richard Mann on the growth, recruitment and microhabitats of o+ riverine fishes. The results of his work included the development and application of point abundance sampling by electric fishing (PASE) for these young-of-the-year fishes as a key step in describing their micro-habitats.

His next role was at the University of Hertfordshire, where between 1991 and 2000 as senior lecturer and then reader, he progressed his research on native and non-native freshwater fish population dynamics, life history and eco-morphology, as well as undertaking various management roles. He then took a research sabbatical for two years at the Institut National de la Recherche Agronomique (INRA), France, before taking his next post that mapped out the remainder of his career when he joined the Salmon & Freshwater Fisheries Team at

the Centre for the Environment, Fisheries and Aquaculture Science (CEFAS) in 2002, where he continued to work right up to the end of his life.

His work at CEFAS commenced with a focus on the ecology and management of non-native fishes. His research on non-native fishes included using the North American sunfish *Lepomis gibbosus* ('pumpkinseed') as a model species, studying its invasion dynamics across Europe and comparing these to aspects of their native life history. Indeed, working on pumpkinseed was a common thread throughout Gordon's career, from first encountering the species during his PhD to one of his final publications incorporating eDNA approaches to detect pumpkinseed presence in the wild. It was during these initial years at CEFAS that he also started working on developing risk screening tools for predicting the invasiveness of non-native species so that managers, policy-makers and practitioners would be much better informed during their decision making processes. Across several



iterations of these tools, the most recent is the multilingual AS-ISK scheme, which has now been applied across numerous countries and fish species. More recently, Gordon was involved in developing eDNA protocols for detecting non-native fish in the wild, and in developing and implementing a regional conservation strategy for crucian carp *Carassius carassius* in Eastern England, bringing researchers and practitioners together to, for example, conserve and restore their pond habitats.

Across this varied research career, Gordon developed an extensive network of collaborators across the world, which he used effectively in his research and to also develop many enduring friendships. Within this network were multiple early career researchers for whom he often served as a mentor, providing advice and guidance to help them in their work. Gordon's mentoring was often 'under the radar' whereby it is only now that the legacy of these efforts is becoming strongly apparent. A common thread in his mentoring is his generosity of providing time to his mentees, providing support which was appreciated by all (such was his dedication, he continued his mentoring right up to the very end of his life).

Gordon published over 230 papers in peer-reviewed journals across a 39 year publishing career, starting with two publications in biotechnology before running through varied topics related to his research, but with multiple papers on subjects including o+ freshwater fish dynamics (including PASE) and the ecology, risk-screening and management of non-native fishes. This record culminated in his award of a Doctor of Science (DSc) from Bournemouth University, UK, where he defended his portfolio of work at his *viva voce* in May 2023. He served as Associate Editor for three international journals in his time (*Folia Zoologica*, *Aquatic Invasions*, *Fisheries Management and Ecology*), before being an Assistant Editor for the Society's *Journal of Fish Biology* from 2020.

It is also important to acknowledge Gordon's contribution to the FSBI. Having followed Gordon as treasurer in 2013, I (RB) can say with no exaggeration that he was the driving force in revolutionising the Society's finances during his tenure, including establishing a strong investment account for the income gained from the *Journal of Fish Biology*. It is these funds that provide the basis for enabling all of the Society's

charitable activities, from PhD studentships to supporting the annual conference. My work – and that of Tara Marshall, the present incumbent – is still being made more straightforward by the foundations laid by Gordon over 15 years ago and the Society could have been in a very different financial place without his contribution.

Accordingly, Gordon leaves a rich legacy from his lifetime's work. This obviously includes his scientific work and outputs, which will continue to influence policy and practice for years to come. However, his legacy also includes the research networks he built and leaves behind, the mentees whose careers he helped develop, and the Society's members who will continue to benefit from FSBI funding awards. So if you are a FSBI PhD student celebrating passing your *viva voce*, a travel grant awardee presenting your first conference presentation, a member attending the annual FSBI conference – or just a member reading this newsletter – then please raise a glass to Gordon and remember his impressive contribution to our fish biology community.

**Robert Britton & Ali Serhan Tarkan**

## Notice

### FSBI new outreach grant

The FSBI is pleased to open a new funding opportunity to support members of the Society to undertake outreach projects. This grant will support projects that:

- Increase public understanding of, and engagement with, fish biology
- Stimulate discussion about fish biology and its implications for society

- Inspire and enthuse people of all ages about the science of fish biology, especially those not previously interested
- Develop skills in communicating the science of fish biology

Grants will not be awarded for purely conservation purposes or any activity that does not promote the science of fish biology. This grant will provide up to **£2,000** to

individuals, teams and organisations to deliver outreach and engagement activities. It will be open to FSBI members and teams and organisations with an FSBI member leading the application.

Applications are currently open, with the next upcoming deadline being the 1st October 2023.

# Travel Grant reports



**In June 2023 Hayley Dolton attended the 6th International Conference on Fish telemetry in Sète, France.**

I presented my Irish Research Council funded PhD research on the regionally endothermic traits of filter-feeding basking sharks. As well as supporting my travel to this conference, the FSBI also part-funded the research I presented at this conference, for which I am very grateful! During the presentation and to fit the theme of the conference, I also spoke about how Jackie and Graham Hall and I designed a completely new method for tagging and retrieving internal temperature probes from free-swimming basking sharks in a tagging process lasting less than second. I met lots of wonderful and inspiring people during the conference, which simply would not have been possible without the support from the FSBI. Thank you!

## **Hayley also reported on the work done on basking sharks and part funded by the FSBI.**

My Irish Research Council funded PhD studentship was supervised by Dr Nicholas Payne of Trinity college Dublin. My research has revealed the basking shark, normally assumed to be cold-bodied, is actually warm-bodied like their close relatives, such as the great white shark.

The team conducted dissections alongside the Cetacean Strandings Investigation Programme, on four stranded basking sharks and found basking sharks have red muscle found much closer to the vertebrae at the trunk of the shark than reported before and a very high percentage

of compact myocardium ventricular tissue of the heart – traits associated with predatory, warm-bodied sharks.

To see whether basking sharks also had elevated body temperatures like their close living relatives, a completely new way of tagging free-swimming basking sharks with a temperature probe had to be designed and deployed. This was achieved by working with collaborators from Manx Basking Shark Watch. The support from the FSBI small research grant allowed for this world-first in biologging to be conducted off the coast of County Cork, Ireland. Expertly skippered by David Edwards, Simon Berrow and Cathal Bunnie, Dolton was able to successfully deploy five temperature sensors into free-swimming basking sharks. The data revealed basking sharks can consistently elevate their body temperature 1 – 1.5°C above ambient. This is again, very similar to other warm bodied sharks such as the mako shark measured at the same musculature depth.

The basking shark is a planktivorous shark, and we now know they share warm-bodied traits with their predatory close relatives, perhaps explaining how basking sharks are capable of behaviours seen in other warm-bodied sharks such as making large oceanic movements over short periods of time.

Please see published manuscript doi: <https://doi.org/10.3354/esr01257>



**Ellie Ward used a travel grant to attend and give a presentation at the 10th International charr symposium**

**which was held in Nikko, Japan from 29th May to 2nd June.**

I arrived in Japan on Friday 26th May and proceeded to have several days exploring the bustling streets of Tokyo ahead of the conference. During these days I was able to visit the Senso-ji temples, hectic food streets of Ginza and the parkland of the old Imperial Palace. On Sunday 28th I took a train out to Nikko, a beautiful small city famous for its many temples and a popular spot for day trippers from Tokyo. The conference began on the Monday morning with a warm and friendly welcome from the organisers, receiving green tea, a huge variety of Japanese treats and my charr symposium T-shirt. On the Monday afternoon I presented my data looking at phenotypic variation of Arctic charr (*Salvelinus alpinus*) populations in two geographically distinct lakes. I received some positive and very helpful feedback which led into discussions throughout the week and a better sense of how to move forward with my research questions.

The talks continued Monday through to Friday, including sessions on evolution, ecology and behaviour, parasitology and conservation, and with focus on Arctic, Brook, White-spotted and Dolly varden charr. It was extremely informative, providing me with a greater background in charr ecology and evolution and helping me to formulate more ideas for my own thesis and manuscripts. The organisers also planned some fantastic excursions including a visit to Lake Chūzenji and a banquet, a seven-course meal that had “Iwana” (the native white-spotted charr) in every course!

I am so grateful to the FSBI for the opportunity to attend this conference! I have had a hugely enriching experience, academically, culturally, and socially.



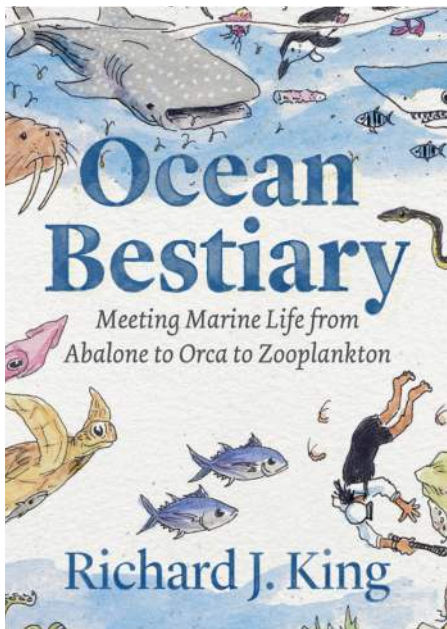
# Book Review

**Debby Mason reviews**

## **Ocean Bestiary.**

**Meeting Marine Life from  
Abalone to Orca to Zooplankton.**

**By Richard J.King. University of  
Chicago Press.**



I was very much looking forward to reading Richard J.King's *Ocean Bestiary*, having enjoyed his book *Ahab's Rolling Sea*, the *Natural History of Moby-Dick*.

On opening the parcel, the cover, full of cheerful, quirky drawings made me smile. Each chapter is beautifully illustrated giving a humorous and light-hearted portrayal of the alphabet of creatures.

Full of interesting facts and anecdotes, the book strikes a balance between entertaining storytelling and some of the less wholesome and often gruesome plight of many creatures at the hands of man.

The author charts the history of marine life starting with the ancient Greeks, with Pliny and Aristotle's accounts of electric rays to pioneers, writers and explorers like Eugenie Clark, Jules Verne, Victor Hugo, Daniel Defoe and Thor Heyerdahl, leaving the reader

wanting to explore further.

With superstitions, myths and legends surrounding mysterious sea serpents, krakens and fantastical beasts of folklore - museums and aquariums gave proof and provided education and opportunities. In the nineteenth century, a Beluga whale transported to the Royal Aquarium in London after a horrific journey from Canada, sadly died after three days. Visitors still paid to see the corpse.

The *Ocean Bestiary* is a delight to dip into, with many of the stories leaving you thinking, 'I never knew that, how curious, or I often wondered how that name or saying came about.'

Ernest Hemingway, of *The Old Man and the Sea* was a keen sports fisher and assisted marine biologists by catching and observing sharks! St. Peter, who walked on water in the Bible, as well as having the John Dory named after him, apparently gave his name to the Petrel - the little birds appearing to tiptoe across the waves with their thin, dainty webbed feet.

Halibut, being too thick for salting would have their heads and fins removed and the rest would be discarded as they were thought to be worthless ...until ice could be carried on board ships.

Climate change, overfishing and coastal pollution are all highlighted. To fur trapping, crayfish catching, shell trading, whaling and abalone hunting by indigenous people through the centuries to the positive changes, perception and realization of the need for sustainability and conservation.

The importance of aquariums and the notion of cetaceans being kept in captivity is also mentioned; for example, research into aging and communication cannot be done in the wild.

*Ocean Bestiary* is thought provoking, authoritative and a celebration of our relationship with the sea. Richard King highlights how humanity and the sea are reconciling with many positive aspects which gives hope. I think the book would appeal to all ages, for anyone who is interested in the sea and marine life.

The book is full of memorable quotes and poems, a couple struck chords with me...

*'I do not care to share the seas  
With jellyfishes such as these,  
Particularly....a Portuguese.'  
Flanders and Swann.*

I was fortunate in March to go diving in the Andaman Sea, but, was stung badly by a jellyfish!

As a Plymothian, and familiar with the story of the voyage of the *Mayflower* in 1620 to the New World, the following words seemed truly appropriate.

*'I do not hold you accountable  
for the actions of your ancestors;  
I hold you responsible for the  
future.'*

These were the closing words of a speech by Paula Peter, a Wampanoag writer and historian, when commemorating the 400th anniversary of the *Mayflower's* arrival in North America.

Debby is herself an artist specialising in marine life. Her website is <https://www.debbymason.com>

# Notice

FSBI 2024 Annual Symposium

## ADVANCING FISH ECOLOGY, MANAGEMENT AND FORECASTING THROUGH OMICS

15th-19th July 2024,  
Bilbao



The 2024 Symposium, convened by AZTI, will present the latest science on omics applied to fish ecology, management and forecasting. The conference will bring together scientists from a range of disciplines to explore ways of integrating our research and strengthening relationships with stakeholders and policymakers to improve the effectiveness of management and conservation.

### Topics to be included are:

#### Omics for fisheries assessment and management:

stock id, avoiding illegal, unregulated, unreported fishing, increasing biological information (age, maturity), compliance with landing obligation, food traceability.

#### Omic applications in aquaculture:

re-stocking, genetic improvement, effect of escapees in wild populations.

#### Genomic forecasting:

understanding genomic level responses to climate change and other anthropogenic impacts (e.g fisheries-induced evolution) for anticipating consequences

such as range-shifts, population decline/erosion.

#### Species interactions:

host parasite relationships, trophic webs.

**Evolutionary genomics:** phylogeography, speciation, local adaptation, causes and consequences of species hybridization and introgression.

Other applied and non-applied **omics ecology** topics.

### We look forward to seeing you in-person in Bilbao!

#### Local Organising Committee:

Naiara Rodriguez-Ezpeleta (AZTI), Natalia Díaz-Arce (AZTI), Oriol Canals (AZTI), Miguel A. Pardo (AZTI), Meritxel Gonzalez Intxausti

(AZTI), Irantzu Zubiaur (AZTI), Manuela Abasolo (AZTI), Ainhoa Ruano (AZTI), Domino Joyce (University of Hull, UK), Will Perry (Cardiff U. Water Research Institute, UK), Chris Brodie (Royal HaskoningDHV, UK)

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## Information Desk

For all membership enquires please contact the FSBI office at:

### Fisheries Society of the British Isles

1 Naoroji Street, London WC1X 0GB

Registered Charity No: 256475

VAT No: 433 4571 60

All enquiries: 020 3925 3477

[theteam@fsbi.org.uk](mailto:theteam@fsbi.org.uk)

Contact person: Beth Glynn-Ramsden

See <https://fsbi.org.uk/membership/> for further information.

Secretary: Dr Ian Winfield

E-mail: [secretary@fsbi.org.uk](mailto:secretary@fsbi.org.uk)