

Exploring the impact of coral restoration on reef fish communities and ecosystem functions

Tim Lamont describes the research collaboration he set up using his Postdoctoral International Travelling Fellowship

This year I was fortunate to be the recipient of the outgoing FSBI Postdoctoral International Travelling Fellowship (fsbi.org.uk/funding/fsbi-postdoc-fellowship/). This grant facilitated a collaborative research project with Dr Tries Razak at IPB University (Indonesia), where together we studied the impact of coral restoration on reef fish communities and ecosystem functions.

Coral restoration: a new frontier

Coral restoration is burgeoning in its popularity around the world, as a response to increasing levels of damage to coral reefs worldwide. Billions of dollars are being invested in projects that aim to restore coral habitat. An important global hub of these efforts is Indonesia – the country in the world with most coral habitat. In our earlier work together, Tries and I had demonstrated that Indonesia was a dominant global force in efforts to restore coral ecosystems, with hundreds of projects spanning over thirty years of restoration effort around the country (Razak *et al.* 2022).

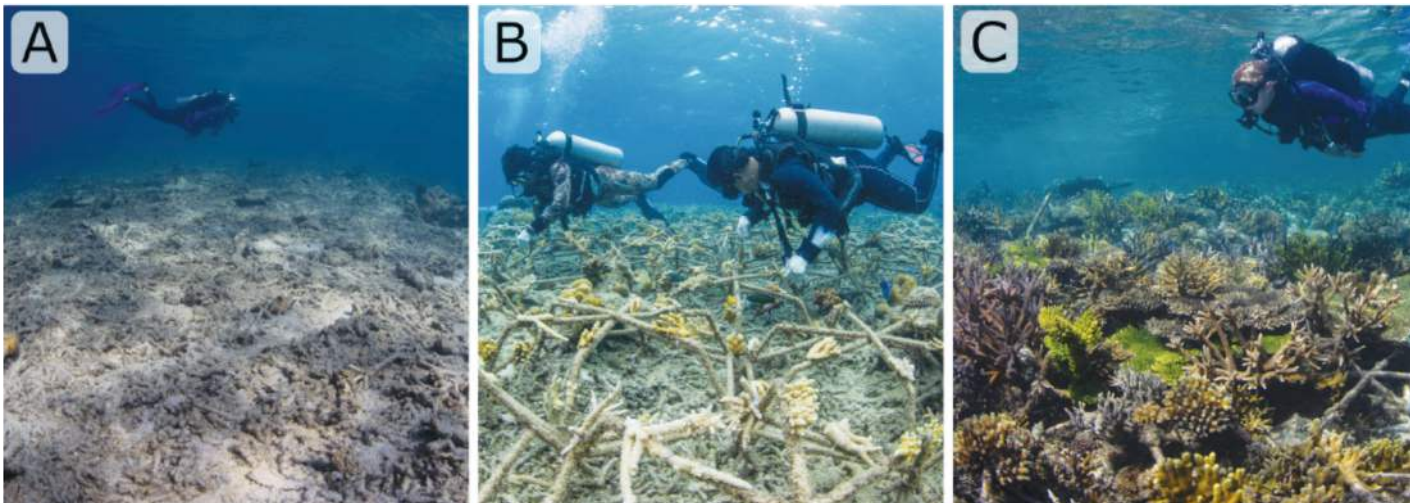
Coral restoration is a science in its infancy. Many of the world's restoration programmes are capable of regrowing some species

of coral on a large scale, but – as highlighted by a review paper in the *Journal of Fish Biology* – much remains to be learned about the impacts of coral restoration on fish communities (Seraphim *et al.* 2020). Fish govern many of the important ecosystem services provided by coral reefs, so this

represents a critical knowledge gap. How does restoring coral impact the development of fish communities? Which fishes are the 'winners' and 'losers' of ecosystem changes associated with restoration? How might restoration be carried out in ways that maximise benefits



Examples of coral restoration projects around Indonesia. Figure taken from Razak *et al.* (2022), Marine Policy. ➤



The Mars Coral Restoration Programme. (A) a reef damaged by extensive dynamite fishing, with coral cover close to 0%; (B) outplanting corals on steel ‘Reef Stars’ at the beginning of restoration; (C) a restored reef after 3 years of coral growth, exhibiting much higher coral cover. (copyright The Ocean Agency/Mars Sustainable Solutions)

for fish communities and the functions and services that they provide? These were some of the questions that Tries and I set out to investigate with this fellowship.

Field studies in Sulawesi

To answer these questions, we chose to use data from one of the world’s largest and longest running coral restoration projects – the Mars Coral Reef Restoration Programme at Pulau Bontosua, Sulawesi, central Indonesia (www.buildingcoral.com). In this programme, steel structures called ‘Reef Stars’ have been used to replant over 4 hectares of coral since 2017, and reefs are monitored annually using standardised benthic and fish surveys. This represented an opportunity to track fish community development through the process of coral restoration. Alongside these existing surveys, we worked with the programme’s restoration team to collect new observational data to better understand the structure of the coral habitat and the functional composition of the fish community.

Expected outcomes

Having had a successful collaborative fieldwork season in Sulawesi, we are now in the process of analysing the data and writing up results. Early findings are exciting, and we’re working

hard to finalise some publications for release next year (watch this space!). We hope that the outcomes of this grant will lead to impact in four key areas:

Scientific impact. We hope that our findings will advance our understanding of coral restoration impacts on fish communities, and their associated contributions to ecosystem functioning and service provision. These are widely recognised as important knowledge gaps that limit the global impact of reef restoration. We hope to be able to publish data in this area soon and present it at

the FSBI meeting in Bilbao next summer!

Management impact. We hope that our findings will have real-world management impact by helping reef restoration practitioners to optimise their efforts, maximising effects on fish community development and ecosystem functioning.

Capacity building impact. This project has been of great benefit to our collaborative work, allowing us to collect data together and further develop the projects that we both work on. It has also given us wonderful opportunities ➤



Dr Tim Lamont (bottom left) and Dr Tries Razak (bottom row, second from right) with the fieldwork team. Tim and Tries worked alongside restoration practitioners from the Mars Coral Restoration Project, along with several other scientists from Indonesian and British universities. (copyright Tim Lamont)

to deliver training and career development for early-career Indonesian scientists as well. Tries and I co-supervise two Masters



Dr Tim Lamont and Dr Tries Razak share a joke during a break between dives. Picture taken during fieldwork in South Sulawesi, Indonesia. (copyright Tim Lamont)

students at IPB University (Rindah Vida and Gita Alisa) who also worked with us during fieldwork and have led their own projects within this work. Rindah and Gita are currently visiting my research group in Lancaster for four months, to progress the writing of their research projects.

Public outreach impact. This project is likely to give us good opportunities for public engagement with science. I have already shared some of the work in online schools events through ‘*Exploring by the Seat of Your Pants*’, and we look forward to publicising the findings of our work when it’s been through peer review.

Transformational opportunities from the FSBI

Tries and I would both like to wholeheartedly thank the FSBI for this grant, and the opportunity

that it has given us to carry out this research and further establish our collaboration. Opportunities for international collaborations like this are hugely beneficial for early career researchers and have given us the chance to develop our work together and explore exciting new research avenues. Many thanks to the FSBI for making it possible for us to start this work – and we look forward to continuing our collaboration for many years to come!

References

Razak *et al.*, 2022. Coral reef restoration in Indonesia: A review of policies and projects. *Marine Policy* 137, 104940.

Seraphim *et al.*, 2020. Interactions between coral restoration and fish assemblages: implications for reef management. *Journal of Fish Biology* 97, 633.

Editorial

The rebound from the Covid pandemic shutdown is clearly illustrated by the influx of reports on PhD work, travel grants and sponsored activities. It is encouraging to see the Society’s activities rushing back to normal and long may it continue; in fact there are more travel reports than can be accommodated in this edition but will hopefully appear in the new year.

An increasing feature of the newsletter is the inclusion of obituaries. In the August issue there was an obituary for Gordon Copp, past Society Treasurer who died at a relatively young age. In contrast, we have in this issue two obituaries for those dying at a more expected age, one for Graeme Harris who was 78 and one for John Blaxter who died at 94.

The account of John’s life is not a full one as I await a proper review of his activities by two people who knew him well. When John was President of the Society I was Treasurer. Before working with him on Society business I had regarded him as a remote and well-known scientist in the same bracket as Ray Beverton or David Cushing. My first contact with him was through the symposium on young fish life histories which he ran in Oban in the early 1970s. This was an important meeting which resulted in a book of collected papers that is still available to buy! As I got to know John better it became evident that he was a great colleague with a good sense of humour and a very supportive approach to the Society’s activities.

This issue then, covers the full span of fishery careers, starting with our young PhD students but also celebrating the lives of those who have made life time contributions to fish biology.

Paul J B Hart
Leicester, November 2023
Next deadline: 1st February 2024

Reports from the Society's PhD students

[All reports have been edited, mainly to reduce their lengths. Some were supplied with references and excellent figures but there is just not enough space in the Newsletter for the detail. *Ed.*]



Rebecca Bentley, University of Bristol

Adaptive radiation is a process where multiple ecomorphologically-diverse species evolve rapidly from one or more common ancestors. There are still, substantive knowledge gaps about whether these general models can apply to all radiations, in part because many are not well researched from the perspectives of their phylogenetic relationships, functional morphological diversification, or the underlying genetic basis of their diversity. During my PhD I hope to address these issues in one of the largest but most poorly understood radiations of riverine fishes – the Loricariid catfishes of South and Central American freshwaters.

Loricariidae is the largest family within the order Siluriformes (catfishes). With 1,044 currently described species, they are the 7th largest family of fishes. Loricariid species are diagnosed by a ventrally facing oral disc,

laterally flattened body shape and conspicuous dermal plating. The family represents a wide range of morphological disparity and body size ranging from 8 to 1,000 mm. The majority of research into this family has focused on their taxonomy and phylogeny.

Loricariids possess two sets of jaws, oral jaws are used to collect food via a rasping motion, while the pharyngeal jaws located further back in pharynx are plausibly used for processing food. There is a wide diversity of oral jaw morphology that has been linked to diet but the extent of diversity in the pharyngeal jaws in loricariids is less clear with most of the research is focused on taxonomic descriptions.

The aim of my project is to further study the evolution of divergent trophic ecomorphology of Loricariids by, i) identifying the link between how this morphology is linked to diet and habitat use but constrained by phylogeny and modularity; ii) is the divergent morphology functional; iii) how does different trophic morphology exhibit divergent patterns of gene expression in jaw morphology; iiiii) can the locations of expression of putative functional genes be confirmed within the jaw structures within an example species, *Ancistrus sp.*?

I have just completed my first year of my PhD programme and am currently finishing the first aim of the project and working on the second. To cover as much phenotypical diversity as possible, I have so far sourced and CT (Computerized Tomography) scanned 53 species from the Natural History Museum, London (NHM) and aquarium hobby. I hope to scan another 15 to represent the morphological and species diversity of Loricariidae. Morphological data has been processed, analysed and

compared to dietary information on species of all current specimens. Hopefully here I can identify if there is link between ecomorphology and the trophic niche and whether specific trophic niches share ecomorphological traits. A species level molecular phylogenetic tree using maximum likelihood has been produced encompassing 560 species and is being further refined. I can use this to identify how trophic ecomorphology has diversified across the clade. Recently I have started working on the second aim of my project which has involved obtaining species from several morphologically distinct groups across the wide range of jaw anatomy and representing the different subfamilies. The experimental design is currently being refined and the next steps are to 3D print different feeding surfaces and trial the feeding experiment. This will allow me to analyse whether the ecomorphological traits are functional and to what extent they might be generalist or specialised.

Ben Parker, Bournemouth University (2018-2023)

After five years and one global pandemic later, I am equal parts happy and sad to report that I have now completed my FSBI-funded studentship entitled “Freshwater fishes and microplastics in an era of multiple stressors”, based at Bournemouth University, UK. When I conceived the project back in 2018, there was a “black box” around freshwater microplastics in fishes with many studies focussing on the occurrence and effects within marine systems. As the primary routes transporting plastic waste from terrestrial into marine systems, freshwaters were therefore an understudied pathway with fishes an excellent model system in which to understand the



factors impacting the ingestion of microplastics (plastic particles < 5 mm in size) and their impacts. Since microplastic contamination occurs in combination with other stressors such as parasite infection and urbanisation, the project also aimed to understand the relative impacts and interactions of different stressors. I am pleased to have contributed to lifting the lid on this “black box” a little and there has been a great deal of research in freshwater microplastics and fishes within the past five years with really important contributions to the field.

Initially, I completed a review of the literature to identify the routes by which freshwater fishes encounter microplastics, the potential factors impacting their ingestion and knowledge gaps within the literature to set up testable hypotheses and future projects. There was also an opportunity to collaborate on a project which for the first time identified angling baits as a potential source of freshwater microplastics. My field projects then tested hypotheses based on the literature review to investigate the relationship of microplastic loads with environmental and biotic features, largely finding low and unpredictable loads unrelated to features such as urbanisation level, fish length and trophic guild amongst other features. From the field data, I then completed a long-term experiment to investigate the ecological effects

of microplastics and parasite infection which found no impact of microplastic exposure but parasite exposure and infection negatively impacted fish feeding. Another PhD working within my institute provided an excellent opportunity to investigate microplastic levels within the critically endangered European eel (*Anguilla anguilla*), ultimately finding a very low incidence. I am still to publish my final data chapter which is investigating the interactions of microplastics and other interacting stressors such as infection and other contaminants on freshwater fishes. I am thankful to all my supervisors and collaborators for their help with this project.

Overall, my thesis results suggest freshwater microplastic contamination is relatively low and unpredictable from biological and environmental features, at least within SW England, while the impacts of microplastic contamination may be relatively minor compared to simultaneous stressors such as parasite infection. Despite this finding, future monitoring of microplastic levels and investigation of the interacting effects of stressors is crucial to inform the management of fisheries and aquatic habitats more generally. There are also knowledge gaps around the interactive effects of key stressors such as warming and eutrophication with microplastic exposure. In most cases, there are “win-win” scenarios whereby steps to mitigate microplastic pollution will simultaneously address other anthropogenic issues such as climate change, for example a reduction in plastic waste production might reduce the rate of climate warming. During my viva, we discussed in detail the role of microplastic pollution in the wider context of anthropogenic stressors and I completed the PhD after some minor corrections.

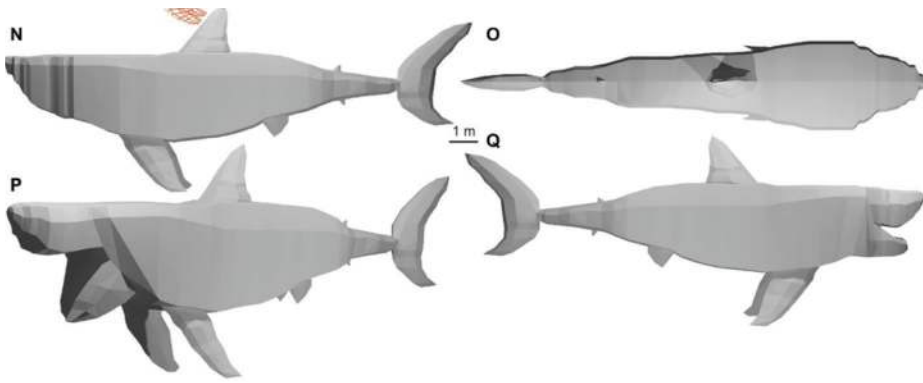
I am extremely grateful to the FSBI for funding my project

research for the past five years, particularly for the support of the council members during and post COVID-19 which had a significant impact on the progress of this project. I was very fortunate to attend and present my studentship research at several FSBI annual symposiums during this period hosted by KU Leuven, Nottingham Trent and Essex universities as well as international conferences with partner societies such as the Japanese Society for Fisheries Science and the American Fisheries Society. The FSBI studentship scheme has really developed me as a researcher, and I am excited and enthusiastic to continue working around fishes and stressors. Thank you once more and I hope to see many of you again in the near future, perhaps at an FSBI Annual Symposium.



Jack Cooper, Swansea University Project: Functional Diversity of Sharks Through Time: Past, Present and Future

Functional diversity describes the array of the ecological functions a group of organisms plays. Such functions can be quantified by combinations of functional traits – measurable characters such as body size and diet that tell us how organisms engage with each other and their environment. In short, this links biodiversity to ecosystem functioning. To investigate this, scientists: (a) gather a pool of species; (b) measure a series



(N) Final lofted polygon mesh of *O. megalodon* used for analyses at lateral view and (O) dorsal view. (P) Visualization of open gape at 75° angle at oblique view and (Q) 35° gape angle at lateral view. Reproduced from Figure 1 of Cooper *et al.* 2022, *Science Advances*.

of traits; (c) form a species-trait matrix; and (d) from this, form a multidimensional functional space based on those trait values; which can additionally be assessed through time by (e) combining this space with the presence and absence of species in different time bins.

Sharks represent an ideal model to study functional diversity through time. Today, they are a highly ecologically disparate group that perform several key functions. Some species like the tiger shark are apex predators; many reef sharks are mesopredators; and other species like the great white transport nutrients between distant habitats and populations via migrations. Despite their widespread importance, sharks are the most threatened marine vertebrates on Earth. The abundance of pelagic sharks has declined by 71% in the last 50 years alone, and a third of their species are threatened with extinction, primarily due to overfishing. This should be alarming as sharks are one of nature's great survivors. Modern sharks have existed for over 250 million years, surviving several mass extinction events in that time, including the Cretaceous–Paleogene extinction event (K-Pg) 66 million years ago that famously wiped out non-avian dinosaurs. Their long-term species richness has of course fluctuated because of extinctions. However, species

losses don't tell us the ecological effects of extinction, while functional diversity changes do. Understanding how the range of shark functions varied through time could give us insights into the possible ecological effects of their ongoing declines.

When it comes to recording functional traits to quantify functional diversity, there is one notable problem for fossil sharks. Their soft cartilaginous skeletons typically do not preserve, so traits like body size often cannot be measured directly. Instead, we must rely on their teeth. These are much harder, and thus preserve more easily, but are also highly abundant in the fossil record as sharks shed thousands of teeth throughout their lives. So, to quantify functional diversity of sharks through time, my PhD first had to determine the usefulness of teeth as proxies for functional traits.

In chapter 1, I conducted a literature review across 56 studies and 68 shark species to see which tooth measurements – called dental characters – linked to three functional traits: body size, prey preference and feeding mechanism.

To conduct chapter 2, the centrepiece of my PhD, I spent a summer travelling to nine museums where I measured the dental characters from chapter 1 in the fossil teeth in their collections. I ultimately ended up with a

dataset of >9,500 teeth across 537 shark taxa dating across the whole Cenozoic era – from 66 million years ago to the present.

In addition to my central PhD result being completed, I have continued my outreach work focusing on the megalodon, history's largest shark.



Ada Eslava, University of St Andrews

My project is centred around studying temporal biodiversity change in two freshwater systems that had so far been understudied using trait diversity approaches.

In the first half of my PhD, I focused on the system of Central Mexico, which is one of the world's hotspots of freshwater fish endemism. The ichthyofauna of this region has received the impact of non-native species introductions and endemic extirpations causing important compositional changes relative to last century. During my project, I have investigated the consequences of these compositional changes for different facets of the biological trait diversity of the fish in a collaboration with researchers from the National Autonomous University of Mexico.

In the second half, I have focused on the tropical montane riverine system of the Northern Range, located in the north of the island of Trinidad, in the Caribbean. An extensive time series dataset of fish biomass and abundance is available for this region for the years 2010-2015.

In addition, we have been able to re-start the monitoring of the same river sites with the same team that sampled them in the 2010-2015 period thanks to the FSBI Studentship Grant. We have so far had two very successful fieldwork seasons in May 2022 and May 2023, and we plan on having a third one in May next year to extend the series to a total length of 14 years. Such long time series data are relatively scarce for tropical systems, so we believe this will be a great resource to continue investigating questions in ecology beyond my PhD project.

In these two trips, I have also been able to access the preserved fish specimen collection deposited at the University of the West Indies Zoology Museum, in Trinidad. This extensive collection contains multiple preserved individuals for each of the fish species monitored in our Northern Range time series. Although these individuals were collected mainly in the 1990s, the collection is nonetheless a great resource for measuring morphological traits on the local fish fauna of the island in a non-invasive manner. The measuring of multiple morphological traits related to locomotion, habitat use and feeding strategy on these preserved specimens has allowed me to characterise these ecological niche dimensions for the species surveyed. With these data, I have quantified trait diversity patterns of change at both the community and the metacommunity level.

With the Northern Range data, I have investigated questions in both applied conservation ecology, asking whether we can detect a signal of recreational disturbance on temporal freshwater fish diversity change, and theoretical ecology, asking whether fish diversity promotes stability in this tropical system. In order to investigate these questions, I have used a novel method for quantifying multiple dimensions of biodiversity change over time in comparable units. This method

is based on Hill numbers which are comparable indices that allow one to disentangle patterns driven by both rare and common species and is being developed by researchers at the National Tsing Hua University of Taiwan.

With most of my analyses now complete, the last year of my PhD will be focused on writing my thesis and the manuscript outputs that have resulted from this work. While the study of freshwater fish diversity change has received considerable attention in the last decade, geographical bias remains in our understanding of how species distributions and abundances are changing. Amid the current Freshwater Biodiversity Crisis, I hope that this project will shed some light on previously unknown patterns taking place in Central Mexico and the Northern Range and improve our understanding of whether these mirror the trends of change in other more extensively studied systems.



Bethany Smith, University of Glasgow

[Bethany has written a detailed report which is unfortunately too long to include here. Anyone interested in the detailed results should contact her. Ed.]

Rising temperature increases caused by climate change present a threat to freshwater fish. As temperature affects a wide array of biological processes in freshwater fish, adaptation and plastic responses to increased

temperature are varied and complex. Insights into the potential for long-term adaptation to warmed habitats can be gained by taking advantage of thermal gradients occurring in the wild. Many fish species occur over wide spatial distances, and so naturally encounter thermal gradients, whether due to latitude or more complex aspects of geography. In this project I aimed to investigate evolution and plasticity in three-spined sticklebacks putatively adapted to different thermal habitats in Iceland, using complementary field and laboratory-based experiments. During the period of 2022 to 2023 I completed the final data analysis for the experiments performed during my PhD project. I wrote this work into a PhD thesis and submitted it for assessment by the University of Glasgow.

The results of my experiments suggest that freshwater fish are able to adapt to increased temperatures within relatively short time periods (~70 generations). Adaptation to the geothermal habitat is complex and appears to involve a wide array of traits, including body morphology and allometry, brain metabolism and neuron development, immune system processes, and hypoxia response. Phenotypic plasticity appears to contribute to thermal adaptation more than genetic divergence, with potential evidence for selection for an adaptively divergent plastic response in geothermal sticklebacks. My results highlight the importance of phenotypic plasticity in thermal adaptation. Populations of fish facing climate change driven increases in temperature may be able to persist through plastic change. However, this is likely to be highly context dependent. Even within a single species I found large differences in the levels of genetic and plastic divergence between geothermal and ambient sticklebacks across populations.



Maisie Evans, University of East Anglia and Cefas

Interactions between sharks, listed under the Convention for Migratory Species, and commercial fisheries

For sharks, a main driver of population declines is through negative interactions with fisheries. Of particular interest to my research is the impacts of commercial fisheries on sharks which migrate to, or around, the British Isles and are listed on the Convention for Migratory Species, CMS. Of the sharks listed, all have undergone management changes over the past 20 years meaning they are sometimes present in reported national landings, but for most species, they are a bycatch (non-target species) due to prohibited status for fisheries in UK waters. Knowing the rate of population removal allows more accurate population modelling and to identify if there are sustainable rates of exploitation for these species. Whilst this will eventually inform management measures, to implement effective management we need estimates of both natural and fishing mortality rates. This includes both at-vessel mortality (those that die in the net or onboard the vessel) and post-release mortality (those that die after release due to physical or behavioural trauma) to create an overall fishing mortality rate. However, before quantifying the mortality for these species, the

first step is to understand and characterise the interactions each of the eight CMS-listed sharks which occur in the British Isles have with our commercial fisheries.

To do this, I have compiled landings data from ICES, ICCAT, and the MMO iFish database to determine which area-gear combinations each species most commonly interact within, and when. Being migratory species, there are annual cyclical changes in interactions rates which are also being explored. So far, the landings datasets (which span 2000-2022) have shown blue shark *Prionace glauca*, tope shark *Galeorhinus galeus*, shortfin mako *Isurus oxyrinchus*, porbeagle *Lamna nasus*, and basking shark *Cetorhinus maximus*, as all being most susceptible to gillnets and trammel nets. The blue shark was confirmed as a summer visitor to the southwest coast of England, which is also where highest tope landings were reported (561.6 tonnes (t) in MMO data). Similarly, porbeagle and basking shark were mostly landed from the southwest of England although for basking shark, records are nominal. On the other hand, of the shortfin mako were predominantly caught in gillnets and trammel nets to the west of Scotland.

Both spiny dogfish *Squalus acanthias* and angelshark *Squatina squatina* interacted more with bottom otter trawls. Like basking shark, data were limited for angelshark but the few records available were from trawl gears in the southwest of England and Irish sea, expected due to their demersal ecology and from previous known range. For spiny dogfish, almost 40% were reported from bottom otter trawls (MMO records) and mostly from the North Sea (all datasets). Finally, the common thresher *Alopias vulpinus* was, as expected due to being a pelagic fish, predominantly caught in midwater and pelagic trawls

(about 50% of reported landings) and, in the MMO data, 99% (11.9t) were caught to the southwest of England.

Most of the CMS-listed sharks have had various management changes over the past 20 years, which has meant they are subject to Zero-TAC or prohibited listings. As such, using data from observer programmes is key to quantifying the interactions these sharks have with our commercial fisheries as better inform the rate of bycatch. I have now begun analysing data from the Cefas Observer Programme (2002-2022). In this data, four of the species are too data-limited for analysis with just one angelshark, one shortfin mako, two basking sharks, and four common thresher sharks, being reported over the past 20 years. However, it has highlighted there is a greater interaction (i.e., more individuals are reported caught) with various forms of setnets for blue shark, spiny dogfish, tope shark, and porbeagle. Bottom otter trawlers are also a gear of interest for spiny dogfish and tope. In terms of areas, southwest England and south and southwest Ireland have highest shark interactions within the Observer data. This mostly aligns with findings from the landings data analysis.

In the future, I am looking to add data from other observer programmes to strengthen the results from the initial study of interactions. I will also be analysing spiny dogfish and tope shark data further, as they are the most data-rich species, to investigate the interactions each sex and age cohort have with commercial fisheries to identify any interaction differences and possible areas of focus. After this, I will be using studies reporting species- or genus-specific at-vessel and post-release mortality rates to estimate total fishing mortality and ascertain the extent of impact of commercial fisheries.

Obituaries

Professor John Blaxter



John was President of the FSBI between 1992-1997. In a future newsletter there will be a full obituary for John, but meanwhile the following is taken from the American Fisheries Society website.

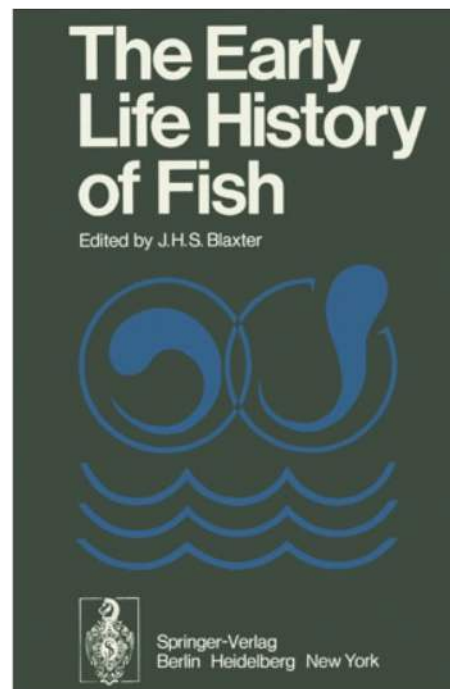
John Harry Savage Blaxter, was born in London on 6 January 1929 and died in Oban on 14 April 2023 aged 94.

J.H.S. Blaxter received a first-class honour in Zoology at Oxford University in 1952. At that time, the Department was headed by Sir Alister Hardy and he recommended John for an appointment to the Marine Laboratory, Aberdeen, Scotland. At Aberdeen, John published a series of papers on herring biology with an emphasis on larval development. John's next position was at Aberdeen University, where he spent five years before moving to the Oban Laboratory of the Scottish Marine Biological Association, where he remained until he retired.

Over a period of 40 years John published over 140 papers (his first in 1953 was published in *Nature*) and books and directed the research of approximately 20 Ph.D. students. His work, focusing on aspects of larval fish development, physiology and behaviour, has influenced many researchers around the world. John has served

on numerous committees and councils, convened conferences, and edited multiple proceedings including *Advances in Marine Biology*.

During his long and distinguished career John collaborated with scientists from many different countries. The careers of many members in the Early Life History Section of the AFS have been influenced by John's research and his teaching. The AFS Best Student Poster Award has been established by his colleagues in recognition of his contributions to Early Life History Research.



[I first came across John in the early 1970s when he organised in Oban a conference on the early life history of fish. At the time I was working at the Oceanographic Laboratory, Edinburgh which was part of the Scottish Marine Biological Association, and ran the Continuous Plankton Recorder survey, which was started by John Blaxter's mentor, Sir Alister Hardy. The conference was attended by some distinguished fish researchers such as David Cushing, Frederick Russell and Olav Dragesund. Ed.]

Dr. Graeme Harris (1945–2023)



Graeme dedicated his professional career to championing fish and fisheries and their sustainable management; in particular that of the sea trout. His love of the natural world took him from Tunbridge Wells in Kent to Liverpool University where he did his undergraduate degree in Zoology graduating with first class honours. He then went on to study for his doctorate under the supervision of Dr. J. W. Jones. He was awarded his PhD in 1970 for his pioneering study on the Biology of Welsh Sea Trout.

After graduating from Liverpool University, Graeme joined the Devon River Authority / South West Water Authority. At the same time, he helped to promote, the relatively new and rapidly developing field of, sustainable fisheries management as the Editor and Assistant Editor of the Institute of Fisheries Management's (IFM) journal, Fisheries Management. In 1976 he moved to Welsh Water Authority (previously Welsh National Water Development Authority) as Principal Fisheries Officer (Research and Development) where he was instrumental in setting up the Fisheries Technical Units which were designed to

ensure that management decisions were based on sound science. In 1989 with the privatisation of the water industry Graeme moved to Welsh Water (Dwr Cymru) as Director of Hamdden, their Land and Leisure subsidiary.

After, Graeme retired from Dwr Cymru he setup his own consultancy business, Fishskill in 2006. In truth he never really retired due to his passion for, and interest in, angling and salmon and seatrout conservation. He chaired the Environment Agency Wales's Fisheries, Ecology and Recreation Advisory Committee from 2006 until the creation of National Resources Wales in 2012 and sat on the Advisory Group of The Salmon and Trout Association, which is now Wildfish.

Through Fishskill he designed and implemented many programmes to protect and restore river habitat in Wales and England. Graeme also undertook innovative fisheries science projects that are still considered as seminal references. Two of special mention were a review of hatchery and stocking practices for salmon that brought much-needed light to their effectiveness, and his truly groundbreaking study of the life histories of sea trout in English and Welsh rivers. This involved reading and interpreting 9,000 sets of scales collected by anglers in a programme that he designed and managed.

Graeme was very keen to ensure that science was disseminated to the broadest range of interest groups and was involved in coordinating and organising research and conferences in relation to sea trout. He was heavily involved in the successful delivery of the 1st and 2nd International Sea Trout symposium in 2004 and 2016, respectively. The Celtic Sea Trout project was also a major international project aimed at learning more about the ecology of sea trout populations in and around the Irish Sea, in order to improve their conservation and management. More recently Graeme was part of the steering committee for the recent IFM Sea Trout Symposia held in Cardiff. The aim was to disseminate advances in our knowledge about the biology, genetics, and behaviour of sea trout and to develop and communicate recommendations for management to urgently restore and protect sea trout stocks in England, Wales, Scotland and Ireland based on the best available evidence.

Graeme wrote articles for various professional and scientific journals and magazines over the years, including Trout and Salmon magazine. Graeme's co-written book with Moc Morgan "Successful Sea Trout Angling", written in 1989, is widely recognised as a classic of its genre. He also

edited the proceedings of the 2nd International Sea Trout Symposium, which was published as a book "Sea Trout Science and Management", within a year, in 2017.

Graeme must have taken to heart Cicero's quote "If you have a garden and a library, you have everything you need" for after family and fishing he was happiest working in the garden and reading – he always had a great thirst for knowledge. Graeme is survived by his wife, daughter and son, two grandchildren and his sister. In his memory the family and the Sea Trout Project Steering Group of the IFM have set up a fund towards a project(s) to better protect and manage sea trout across the British Isles. This is something that Graeme had called for over many years and is the outcome from the recent sea trout symposium and workshop. The fund <https://www.wildtrout.org/shop/donations> will be administered by the Wild Trout Trust and any donations will be ringfenced towards the protection and management of sea trout.

Miran and Dusty Aprahamian

[On a personal note, Graeme was in the same Zoology Honours year as myself and we did our PhDs with Jones at the same time. As a student Graeme was hard working and collaborative, characteristics which characterised his life. Ed.]

Travel Grant reports



Dr Matthew Burnett, a post-doctoral researcher from the University of KwaZulu-Natal, Pietermaritzburg campus, South Africa, reports on how he used an FSBI travel grant to attend the Fish Passage Conference in held at the Pacific Northwest National Laboratory (PNNL), in the Tri-cities, Washington State, USA.

He combined his trip to visit the fisheries research lab at the University of Wisconsin, Stevens Point (UWSP).

Visiting the PNNL laboratory and seeing the large-scale fish passages that aid the salmon migrations was something he had only read about before. Seeing this in person was a dream come true and an eye-opener as to the possible potential to prioritise river connectivity and fisheries back in South Africa. Matthew is currently researching the efficacy of fish passages in South Africa using passive integrated transponder technologies, a first application for the region. In addition, he is implementing the FISHTRAC programme he co-developed that uses fish behaviour response to indicate freshwater ecosystem well-being.

“I was in awe of the large scale and design of fish passages for both upstream and downstream migration

and how they are monitored for efficacy.”

Matthew has been developing and using fish telemetry techniques to answer much needed biological questions for African freshwater fishes and freshwater ecosystem management. His goal is to see these studies feed into water resource and fisheries management. His research career often draws on literature in the Global North because of limited fish telemetry studies in Africa. Having the chance to visit the USA and meet some of the leading researchers in this field and fish telemetry applications to manage salmon and fish passage solutions was phenomenal.

“I could not believe the amount of resources provided by both private and national sources that is put into fish research. This cannot be matched in South Africa.”

With fisheries management poor in the region, Matthew is prioritising this research field to improve how we manage water resources and meet the endpoint for fisheries. Inland fisheries in South Africa is mainly subsistence-based, with a relatively large recreational industry worth over ZAR 32.6 billion (US\$2.2 billion). Visiting the UWSP was exceptionally helpful in demonstrating how successfully subsistence and recreational angling industry can be researched for effective management. The fieldwork experience obtained at UWSP was enlightening and showed how often relatively simple data collection and analysis methods are applied. This was encouraging for an early career researcher based in the Global South.

“We often hear of the large economies tied to the fisheries industry in USA, but to see it first hand, I realised the magnitude of it and how much

is invested into it. Something we need to start taking seriously in South Africa”

Matthew says the best thing he gained from his travel experience was the side-by-side conversation with other innovative researchers about similar challenges faced to get outputs and answer much-needed research questions. Added to this was interaction with some of the “locals” to understand day-to-day life in the USA. This was the first in-person conference after the global pandemic, and travelling was a refreshing change from multiple lockdowns. This was a reminder of how social, even introverted fish biologists, can be.

“There is so much to learn from each other, and I thank the FSBI for the travel grant that provided this opportunity for me.”



Catherine Baungaard used a travel grant to attend the 21st Swiss Climate Summer School: Climate-water-energy-food nexus from September 3rd to 8th 2023 in Ascona, Switzerland.

In September 2023 I had the opportunity to join the 21st Swiss Climate Summer School organised by ETH Zurich in the beautiful town of Ascona, Switzerland. You may be thinking, what is a nutritionist interested in sustainable

seafood doing at a climate summer school? Definitely not modelling climate change impacts! I had the chance to present my research on modelling the role of seafood in sustainable diets to a multi-disciplinary group of ~80 PhD students and leading experts in the field of climate science, governance, nexus thinking. This year's topic was the Climate-water-energy-food nexus, which I felt was really relevant to my research and personal interests. My favourite talks were by Professor Jessica Fanzo on how dinner can change the planet, Professor David Bresch on the concept of panarchy as a framework to characterise complex systems. I joined a workshop on whether we should have value-free science and what that could mean for my research. The summer school was an excellent opportunity for me to present my PhD project to an external audience, network with other researchers who are also interested in making our food systems more sustainable. I am very grateful for the support of the FSBI with this travel grant and for supporting such an invaluable experience.

Tairan Li, City University in Hong Kong was funded by the FSBI to attend and present a paper at the 13th Triannual Conference of the International Congress of Vertebrate Morphology: ICVM 2023, between 28th July and 1st August 2023 in Cairns, Australia.

The conference gathered over 430 talks and posters from the entire academic breadth of research on extant and extinct vertebrates. It was exciting to be part of the first return after the COVID-19 pandemic and to present my talk 'Lessons from really big fish: integrating incomplete data in parametric modelling of coherent skeletal mode' as part of symposium

'More Than Sucking, Chewing, and Swallowing: Feeding Biomechanics in Vertebrates and Beyond'.

My talk highlighted methodologies developed for the construction of posable 3D kinematic models of the feeding apparatus of the filter-feeding basking sharks, an endangered and giant species whose specimens are hard to find and extremely challenging to CT scan.

The flight to Cairns required transfer at Melbourne, where I stopped to join my team at the Victoria Museum to work on an extremely rare basking shark specimen, from which interesting skin denticles were collected. We visited Le Trobe University to have the denticles locally scanned.

The five-day conference showed the amazing biodiversity that has and is thriving on this planet. It was fascinating to share and attend great talks by researchers from across the world. I met new collaborators at the conference whom I have introduced to my Principal Investigator after my return. We have started PhD funding application for me to carry out research on wearables inspired by lizard skin.

On the last day of the trip before my night flight, I jumped spontaneously on a boat trip to witness corals, wild fish and whales for the first time in my life. The whole chain of events wouldn't have been possible without Travel Grant from FSBI. It supported me to travel and carry out multiple international academic events right next to nature's wonders.

Miriam Shigoley, Hasselt University, Belgium used a travel grant to attend the 7th International Conference of the Pan African Fish and Fisheries Association in Congo Brazzaville.

I shared part of my research project on the parasitology of Nile tilapia, one of the world's



foremost aquaculture fish species. My work highlights the need to integrate fish parasitology into the One Health approach for sustainable Nile tilapia production and management. While there is extensive literature on parasites affecting Nile tilapia, only a handful of studies investigate the actual effects and environmental correlates of these parasites. This suggests a huge research gap in the field of parasitology. Moreover, when we compare the number of described parasite species to the limited studies that investigate their impacts, substantial knowledge gaps remain. As a result, the existing information on these parasites lacks practical utility for stakeholders involved in Nile tilapia production and management. To address these gaps and provide actionable insights, I advocate for the adoption of a One Health approach and conduct more research on the same. This approach not only takes into account fish health but also environmental integrity, and consumer well-being. By deepening our understanding of how Nile tilapia, their parasites, and the environment interact, we can make more informed decisions to promote sustainable Nile tilapia production. Additionally, I had a great time at the conference where I conducted a survey on my research topic and established useful connections. This networking opportunity would not have been possible

without the support from the Fisheries Society of the British Isles (FSBI). I therefore extend my heartfelt gratitude to FSBI for their assistance in advancing my research.

Eric Diaz Delgado, Zoological Station Anton Dorn, Naples, Italy used an FSBI travel grant to allow him to take part in the FSBI annual symposium of “Fish habitat ecology in a changing climate” at the University of Essex, UK.

The FSBI annual symposium took place at the University of Essex, Colchester, UK from the 24th to the 28th of July 2023. Many great oral presentations and posters covering a wide variety of fish biology topics including distribution, management, critical habitats, food webs, and connectivity, were shared. On Monday, workshops and various ice-breaker activities took place. Talks started on the following day, where I gave an oral presentation about the use of isotope biomarkers of vertebrae,



jaw, and teeth for estimating field metabolic rates in elasmobranchs. I also had the opportunity to participate in a poster session where we presented feeding habits of a common elasmobranch mesopredator (*Mustelus* sp.) from the Mediterranean Sea through stomach content and stable isotope analyses. The rest of the week was also full of interesting and high-quality presentations.

I can certainly say that my participation at this event was very productive. It allowed me to present a portion of my PhD work to the scientific community and engage in interesting discussions

with many colleagues and well-known researchers. Receiving positive feedback is always a “pump” of motivation to attend more of these events and continue conducting research. Furthermore, I had the opportunity to meet many wonderful people from around the world, thereby expanding my professional network for future research and potential collaborations.

I would like to express my gratitude to the FSBI for awarding me this travel grant. It was an enriching experience, and without this grant, my attendance would not have been possible. I also want to thank and congratulate the entire organizing team for their efforts in logistics and planning, for making such a great event.

Notice

Check out the latest YouTube video

from our Publicity Coordinator, Dr William Perry, which covers tips on how to promote your research on Twitter (or X!). Originally shown at the FSBI 2023 Symposium at the University of Essex, the five-minute video outlines five top tips on how to best promote your research, while also showcasing data which supports beneficial practices. Therefore, if you want to better promote your research online, and have a high tolerance for fish-based metaphors, this is the video for you!

Like and subscribe to our YouTube channel for more videos delving into the world of fish

and fisheries. If you are an FSBI member involved in work that contributes to the aims of the Society, and you would like to feature in the series, please get in touch: perryw1@cardiff.ac.uk



FSBI Sponsorship Grant report



and



Venkata Amarnadh Surapaneni

Mason Dean

both from City University, Hong Kong, obtained sponsorship from the FSBI to support a meeting on *Filters in Biology+Biomimetics 2023*. (URL: <https://fibb2023.com>)

The conference took place at the Matters of Activity Cluster of Excellence, Humboldt University Berlin, Germany, May 15th-16th, 2023. The conference was the first of its kind, devoted to multidisciplinary solutions to fundamental questions regarding how biological filters work and what we can learn from them. FiBB united diverse experts interested in particle filters in nature from around the world and as a result built a novel and rich international scientific network. The two-day FiBB meeting had 36 participants (23 male, 13 female) from 10 countries, with 15 established and 21 early

career researchers from diverse disciplines such as anatomy, biomaterials, ecology, evolution, physics, mathematics, architecture, design and engineering. Each day began with a keynote talk from an expert – in suspension filters, biomechanics and biomimetics – followed by morning and afternoon talk sessions where all conference participants presented their work. On the first day, we organized a ‘walk & talk’ session where participants from different disciplines were paired and given time to stroll and chat in the city, facilitating one-to-one interdisciplinary discussion. We organized a welcome reception the evening before the conference, a boat trip on the first evening, and a conference dinner on the second night.

With the generous funding received – from FSBI and others – we were able to offer the meeting without registration costs. The funds obtained were instrumental to the conference’s success, being used to fund travel and housing for our early career participants, social events, and conference notebooks and bags. Funding from the FSBI was acknowledged at the conference opening and closing presentations and on Twitter and the FSBI logo was displayed prominently in conference materials and on the conference website. Participants were positive particularly with the size of the meeting, and length of the talks; with the amount of time available for scientific discussion; with the diversity and relevance of the talk topics; and with the openness and freedom for sharing innovation thoughts. One of our aims was to create a community with this conference and we believe we have been successful – by the end of the conference, several participants expressed interest in collaborative multidisciplinary grant applications and projects, and all participants supported the plan for a second conference, hopefully in two years.

We thank FSBI for supporting us in making this event a reality and great success.



Informal meetings: Casual scientific discussions were also an important element of our social events: (L to R) welcome reception, outside gathering and boat trip on the Spree river.

Notice

9th World Fisheries Congress



The 2024 World Fisheries Congress (WFC) is only a few months away. The theme for this congress is *Fish and Fisheries at the Food-Water-Energy Nexus*. The program features 4 invited plenary speakers and more than 60 general sessions, educational workshops, and roundtable discussions. We have received over 1,200 abstracts from participants in 72 countries. Important information and deadlines:

- Registration is now open online at: <https://wfc2024.fisheries.org/registration/>
- Discounted early registration rates end on January 31, 2024 at 11:59 PM EST
- If a travel visa is required to travel from your country to the United States, please apply for a travel visa as soon as possible to ensure in-person

attendance to the congress. Countries that require a visa to travel to the United States are listed at: <https://travel.state.gov/content/travel/en/us-visas/tourism-visit/visa-waiver-program.html>

- Exhibitor and vendor registration now open at <https://wfc2024.fisheries.org/exhibitor/#>
- Meeting sponsorship and advertising packages now available at <https://wfc2024.fisheries.org/sponsorship/>

Please continue to advertise the 2024 WFC to your Society membership through email, your newsletters, your social media accounts, and at your Society meetings. The WFC Communications Team has created a Communications Toolkit that includes a wide variety of social

media posts, printable fliers, PowerPoint slides, and other materials to make it easier to promote the WFC. The toolkit is online at:

Google Drive

https://drive.google.com/drive/folders/1kIGkVoN6RiB6ovZXKBlhn8zRnGuiSvl8?usp=share_link

Dropbox

<https://www.dropbox.com/scl/fo/uvetamxotzolgilyqlae5j/h?dl=o&rlkey=focyl69ioswmq81w98zr9t3pe>

If you have any problems with access, please contact: Corinne Burns (burnscorinnem@gmail.com) or Julie Claussen (juliec@illinois.edu).

Notice

Announcement of Joint Studentship membership of FSBI and Institute of Fisheries Management

The FSBI and IFM have many overlapping aims and offer services to researchers, fisheries professionals and others simply interested in fish science, fisheries and their management. In recognition of this we have been developing a partnership as jointly agreed by the respective Councils in December 2020. Given the importance that both organisations attach to encouraging and supporting new recruits, one of the initiatives is a Joint Student Membership. This will give student members of either organisation access to the student services of the other at no extra cost.

The aim is to broaden the membership base, improve communications amongst fisheries researchers, technicians and managers, and nurture careers.

There are significant reciprocal student services available, which are set out below:

- Heavily discounted delegate rates for attendance at annual conferences and special events,
- Reduced rates for IFM training courses,
- Access to Journal of Fish Biology (online) and FISH magazine (online),
- Opportunity to apply for funding from the FSBI award/grant schemes (see below)
- Opportunity to apply for funding through the IFM Peter Spillett Award,
- Opportunity to present research at IFM branch events, workshops and specialist conferences,
- Networking opportunities at IFM Branch events and FSBI Symposia,
- Support through the IFM Mentoring Scheme,
- Discount on high-cost items such as drysuits and Dell

computers through IFM members' benefits,

- FSBI Voting rights and FSBI Newsletter,
- IFM voting rights at AGM's,
- Joint membership of the two organisations enhances CV's by demonstrating diversity of interests and activities and maintenance of professional standards.

The FSBI grant schemes and application dates are detailed on the FSBI website.

What happens next?

Due to GDPR regulations, existing student members of both organisations will be required to opt-in to joint membership. E-mails are being sent now to all the respective student members informing of the change and the simple instructions to register.

If you have any questions about this please get in touch with Beth Glynn-Ramsden of the **FSBI Membership Team** on theteam@fsbi.org.uk, or 020 3925 3477.

Information Desk

For all membership enquires please contact the FSBI office at:

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

Secretary: Dr Ian Winfield

E-mail: secretary@fsbi.org.uk