

Lateral Lines

AUSTRALIAN SOCIETY FOR FISH BIOLOGY NEWSLETTER



In this issue...

.....
Functional morphology

Endangered seahorse

Science in a changing world

Basin-scale telemetry



ASFB Executive 2019-20

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Lateral Lines is the Newsletter style journal for the Australian Society for Fish Biology (ASFB), published twice a year. It welcomes contributions from all its members. The ASFB was founded in 1971 with the aim of 'promoting research, education and management of fish and fisheries and providing a forum for the exchange of information'.



Michalis Mihalitsis is a PhD candidate at the Reef Fish Ecology and Evolution Lab, James Cook University, Queensland. His work focuses on fish predation on coral reefs, with a main interest in the functional ecology of predatory fishes and how their feeding abilities may subsequently influence fish communities. Most of this work is based on functional morphology and experiments in an aquarium-based setup, as well as field-based projects.



Dr Dave Harasti is a marine scientist who has been working on the conservation of threatened marine species (sharks, seahorses and fish) for the past 20 years. He currently works as a Senior Research Scientist for Fisheries NSW and completed his PhD in 2014 on the White's Seahorse *Hippocampus whitei*. He is an avid scuba diver and has a passion for underwater photography, particularly looking for small and rare marine critters.



Dr Alistair Hobday leads the Marine Climate Impact and Adaptation area at CSIRO. His research spans a range of topics including spatial management and migration of large pelagic species, environmental influences on marine species, climate change impacts on marine resources, and the development of adaptation options for marine conservation, fisheries and aquaculture. Alistair was the 2018 ASFB K Radway Allen Award recipient.



Dr. Chris Bice is a research scientist at SARDI Aquatic Sciences in Adelaide and a South Australian representative on the ASFB Executive Council. Chris's primary areas of expertise include fish movement, fish passage, threatened species ecology and the response of fishes to changing flow regimes. He works predominantly in the Murray-Darling Basin, particularly the lower River Murray.

Contributing to this issue ...

ON THE COVER: Coral trout *Plectropomus leopardus* mouth morphology; photo Michalis Mihalitsis

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Editorial



As we welcome our new president Dr. Alison King, and a refreshed Executive Committee for 2019-2020, the time has come for me to say goodbye to the ASFB Newsletter! It has been a fantastic time getting everyone's stories together, getting to know more about each one of our members, and helping spread the

word of the awesome work our society does.

I feel very proud of the changes introduced during my time as editor, including our new name, which was won fair and square by Chris Fulton, one of our ex-presidents. Well done everyone for making *Lateral Lines* awesome, putting your energy and creativity into it, and making it every time a more

special and important publication for Australia's fish research. I'm looking forward to working with the new editor and making the handover as smooth as possible.

This year's newsletter has some great contributions. Michalis Mihalitsis brings us insights into how functional morphology can be translated into a better understanding of marine food webs and ecosystems; Alistair Hobday shares a summary of his K Radway Allen Award talk at the ASFB Conference in Canberra giving a positive perspective into where our science should move into to better address rapid environmental change, and Dave Harasti shares the amazing story of Australia's first endangered seahorse! Read on for the usual updates from all our members, committees and students, and get excited about being a member of the ASFB!

It has been a great pleasure being your editor,

Katherine Cure

Lateral Lines editor; newslettereditor@asfb.org.au.

President's Preamble: A Presidential Hand-Over



Thank you everyone for welcoming me as President for the next couple of years. I have been very humbled by the support I've received and hope that I can serve our Society well. I would like to thank our out-going Executive for their contribution to the running of the

Society, and acknowledge some amazing people on our Executive Council. Firstly, thank you to our out-going President, **Harry Balcombe**. Harry has done an incredible job keeping the boat floating through some tricky waters over the last few years. His patience, calmness and jovial manner has been a real asset during his term. We've also said "Thank you, and now you can relax!" - to our Past-President, **Chris Fulton**, who has worked tirelessly in his various roles with the Society over the last six years. I also want to particularly acknowledge our incredibly dedicated Treasurer (**Lenore Litherland**), Secretary (**Charles Todd**), Conference Coordinator (**Brendan Ebner**), Communications Manager

*(Andrew Katsis), our Sub-Committee Chairs and the rest of the Executive Council members. I also welcome **Gretchen Grammer** as our new Vice President and all of the new Executive Council members; I look forward to working with everyone in the new year. Finally, I want to thank **Katherine Cure** for all her hard work over the last few years as Newsletter Editor she has done a great job on making “Lateral Lines” a sought-after read on our calendar and wish her well in her post-editor life.*

Our Society is flourishing! We currently have 411 members, including 112 student members – a good indication of a strong and vibrant future for the Society. Our dynamic communications platforms through our newsletter and social media presence (Facebook, twitter) is no doubt helping to spread the word about the great work we do. We currently have over 7,800 likes on Facebook – which is nearly twice as much as the American Fisheries Society – not that we’re gloating!! We also have over 2,300 followers on Twitter, again a substantial gain from last year.

Our Executive Council has been busy over the last year, including reviewing aspects of the Constitution, developing a code of conduct, developing a Terms of Reference for the renewed Future of the Society sub-committee (FOSC), and the normal running of the Society (see the AGM minutes for details). In 2020, we hope to form the FOSC, assist in the running and promoting the World Fisheries Congress, and discuss and develop strategies for our 50th celebration in 2021 – amongst other tasks I’m sure!

As usual, our Annual Conference was INSPIRING! Held in Canberra, with over 250 delegates attending, the congress had a theme of “Communicate to Illuminate & Inspire” – and it sure did that. We all thoroughly enjoyed the diversity of keynote presenters exploring a range of communication strategies to get our message out there! Another highlight was the Big Messages for Decision Makers – a public open forum for a range of presenters to speak their mind and summarise the key messages from their

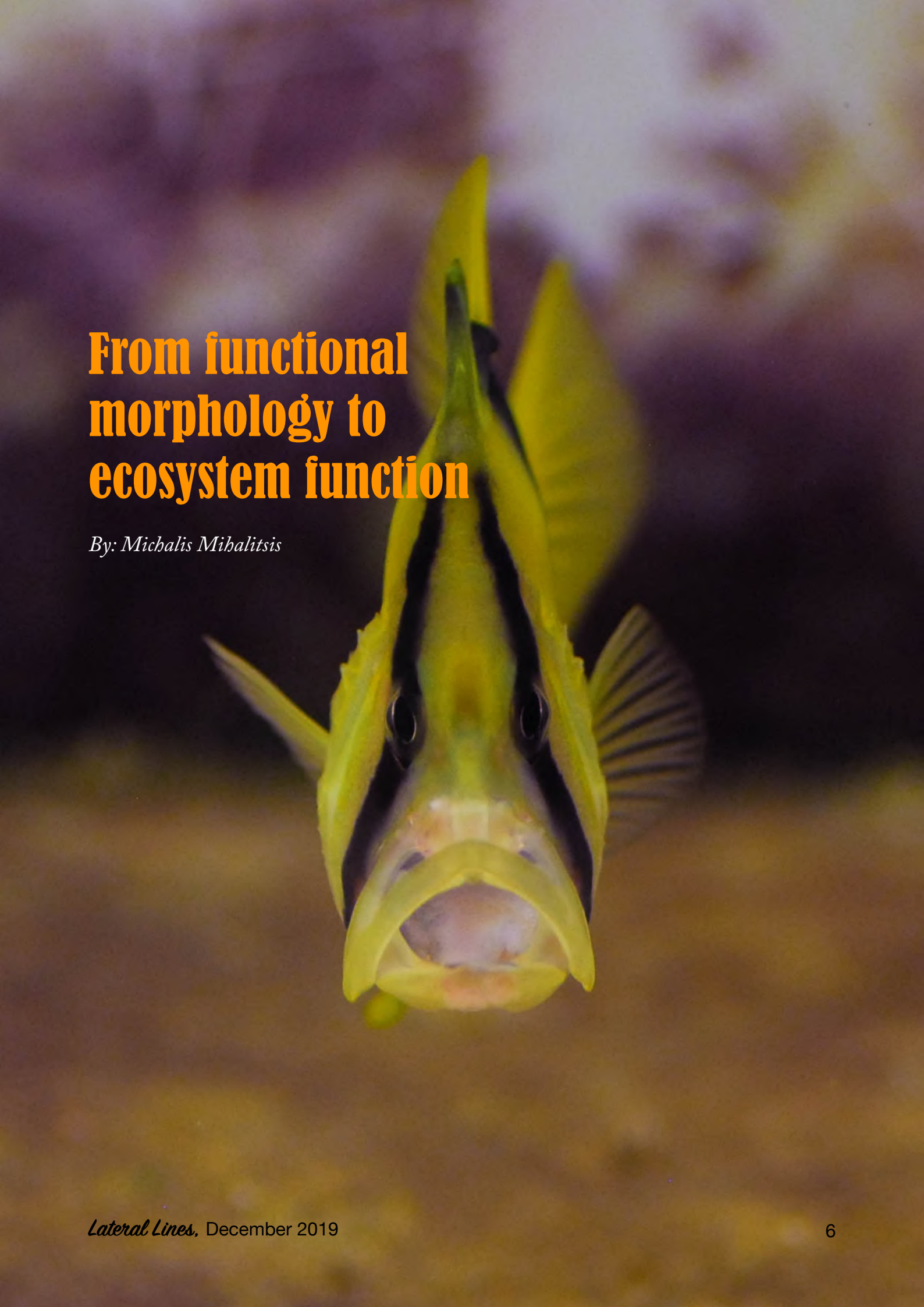
*perspective. Of course, it wasn’t all talks! The social events were fabulous, who could forget the Student pub quiz or the wild band at the dinner. Congratulations and a big thankyou to **Chris Fulton**, all the local organising Committee, and ASN events.*

Our next Conference will be huge! The World Fisheries Congress will be held 11-15th October 2020, and is the largest gathering of the world’s fish research, industry and management sectors. The Congress will be a supercharged version of our normal ASFB meetings, but will have the allure of a large number of international delegates, that will increase networking and learning opportunities. The Congress organisers are striving to make the event heavily subsidised for students. I encourage all members not to miss this key international fisheries conference, right here, on our turf.

Finally, I hope you all have a lovely and restful Christmas and New Year. Please stay safe, have heaps of fun over your holidays and we look forward to seeing you in 2020.

Alison King

ASFB President



From functional morphology to ecosystem function

By: Michalis Mihalitsis



Above What's in a mouth? The dentition of predatory reef fishes can tell a big story about their ecological role

So first of all, what is morphology? It means to study the form of things, and it has been around for centuries. Naturalists would look at an animal and try to describe its form. These descriptions led to observations such as: "why is the tail shape of this fish different than other fish?". Questions like these, triggered the uprising of a new field: functional morphology. So how does putting the word 'functional' in front of morphology change our definition? While morphology is primarily a descriptive study (i.e. the mouth size of a fish has x and y dimensions), functional morphology links the phenotype of animals with what they are able to do, also known as performance (i.e. the mouth size of a fish has x and y dimensions, and is therefore able to feed on prey that has x or y dimensions). In other words, functional morphology shows how animals are using the tools they have, to overcome every-day tasks, like feeding.

“ functional morphology shows how animals are using the tools they have, to overcome every-day tasks, like feeding”

Establishing such a causal relationship between morphology and performance, is done through experiments where both morphology and the behaviour of how the animal carries out a task is quantified. Only then, can a link be established between morphology and function. For example, in a recent study, I established 18 different gapes for predatory coral reef fishes, starting from the mouth, continuing all the way down to the stomach (morphology). I then made some inferences about the maximum prey size that these fishes would be able to feed on, and which gape would be best for predicting their maximum prey size. To establish a causal link however, it is essential to test these inferences in an experimental setup, where performance tests on the trait of interest (gape) is



quantified with regards to the task in focus (feeding on prey). In this study, I found that the horizontal oral gape in a mechanically stretched position, was the best predictor for predatory fishes that eat their prey whole.

Why are we interested in establishing these links? Just like different parts of morphology are used by the organism to aid in a specific task like swimming or feeding, a similar principle may be used at an ecosystem level, where different organisms living in an ecosystem, provide a specific function within that ecosystem. For example, parrotfish are fish that live primarily on coral reefs. They have beak-like fused teeth which allow them to scrape the reef substratum and remove algae. This removal of algae from the reef, subsequently may allow the settlement of coral recruits. In essence, just like different bones and muscles work to produce a function for the individual fish (i.e. feeding), multiple fish carry out a function in the ecosystem (i.e. algae removal).

However, some species of parrotfish have different bone morphology and musculature associated with their jaws. The implications of such variation in their functional morphology, is a stronger bite which in turn results in these fishes being able to bite deeper into the reef substratum and remove part of that substratum. This in turn means that fishes with these abilities aside from



Above Differences in mouth morphology and dentition amongst predatory coral reef fishes

“ based on their functional morphology, fishes provide ecosystem functions that have significant implications for coral reef dynamics and resilience ”

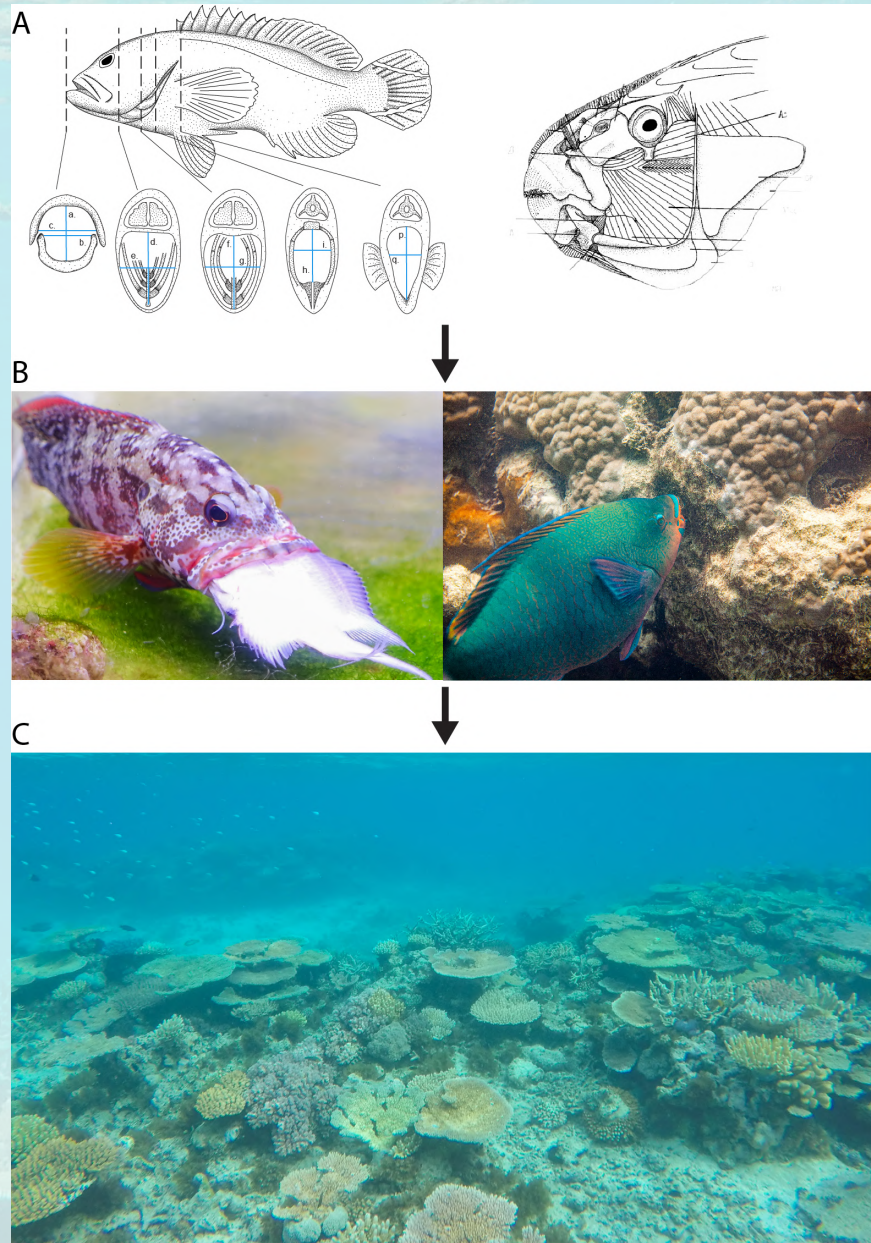
removing algae, can provide another ecosystem function; in this case bioerosion. Ecosystem functions like algae removal and bioerosion, have significant implications for coral reef dynamics and resilience, making these fishes crucial for these



ecosystems.

Coral reefs are currently facing multiple stressors such as climate change, overfishing, and pollution. It is therefore essential to know more about the ecosystem functions that different groups of fishes provide to the reef, and which ones are essential for reef resilience in the Anthropocene. The lesson to be learnt here however, is that these ecosystem functions are a result of the abilities of what the fish as an individual is able to do, and how it uses its morphology to complete everyday tasks. In other words, morphology may have started as a simplistic and descriptive field, but may now be a gateway to understanding the functional roles of fishes in complex ecosystems that are threatened by climate change.

For more information on functional morphology and ecosystem function of coral reef fishes, see: [\(1\)](#) and [\(2\)](#).



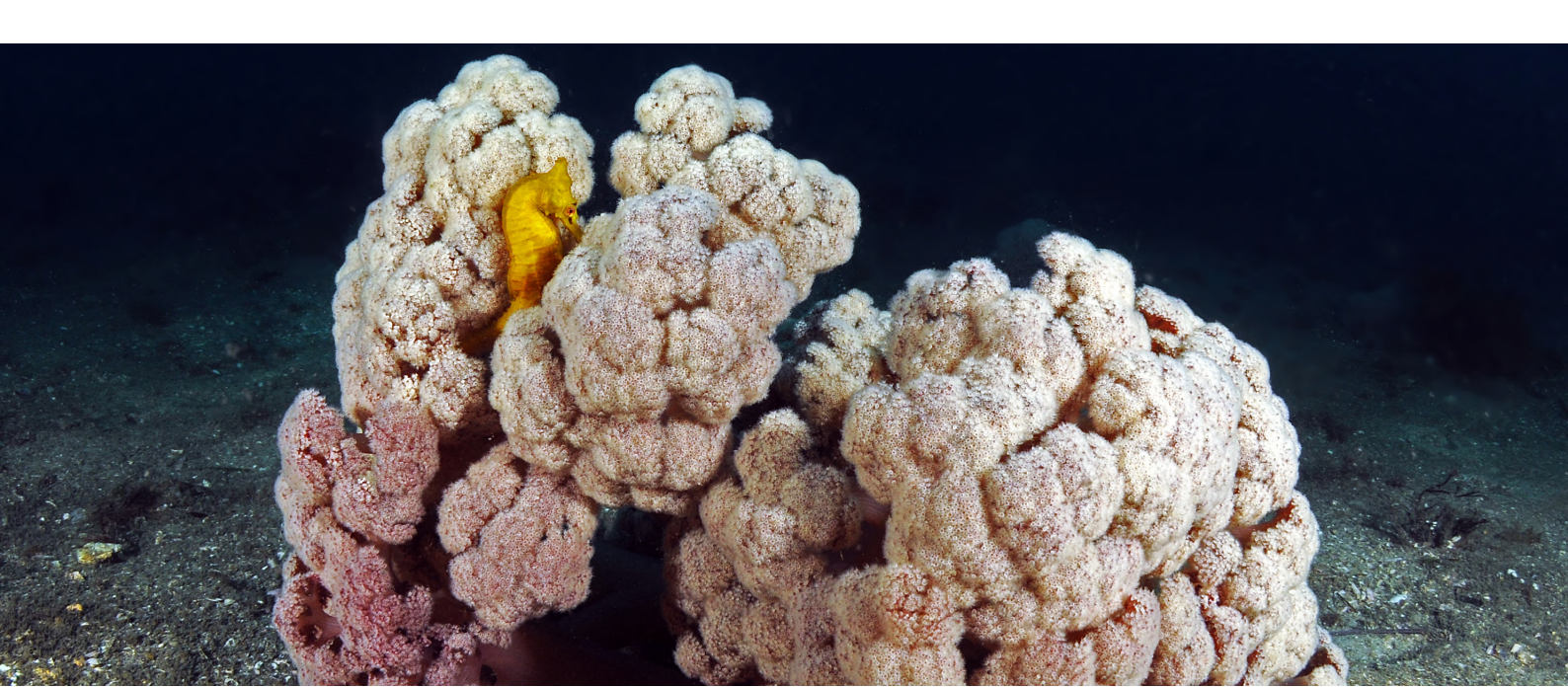
Above Diagram showing how functional morphology of fishes can lead to understanding of ecological roles and ecosystem resilience





**Australia's
First
Endangered
Seahorse**

By David Harasti



Above White's seahorse in soft coral habitat

The White's Seahorse (*Hippocampus whitei*), also known as the Sydney Seahorse, is a medium-sized seahorse that is endemic to the east coast of Australia. The species is named after John White, Surgeon General to the First Fleet, and is found from southern Queensland (Hervey Bay) to Sussex Inlet (New South Wales). It can be found occurring in coastal embayments and estuaries and in NSW it is most abundant in locations such as Port Stephens, Sydney Harbour and Port Hacking.

In October 2018, the White's seahorse became the 2nd seahorse species in the world to be listed as 'Endangered' on the IUCN Redlist of threatened species. Following this international listing, in October 2019 the species was listed as Endangered in New South Wales (NSW) under the *NSW Fisheries Management Act*. The reason for the endangered species listing is a result of large population declines across NSW over the past decade. The primary cause for the decline in abundance of the White's seahorse is loss of natural habitats across their range in eastern Australia. As the seahorses occur within coastal estuaries and embayments, these areas are subject to population pressure.

“ In October 2018, the White's seahorse became the 2nd seahorse species in the world to be listed as 'Endangered' on the IUCN Redlist of threatened species ”

Within Port Stephens for example, over 90% of the soft coral and sponge habitats have declined at sites where the seahorse used to be abundant (Harasti, 2016). Habitats in Port Stephens were destroyed through the installation of boat moorings, anchoring by boats and the inundation of habitats by sand movement. It has been shown that adult White's seahorse show a preference for sponge, soft coral and *Posidonia australis* seagrass habitats whilst juveniles used gorgonian fan habitats, sponges and soft corals (Harasti et al., 2014). In the Sydney region, they are most likely to be found occurring on the artificial protective swimming net habitats and will selectively choose artificial habitat over some natural habitats (Simpson et al., 2019).

“ The primary cause for the decline in abundance of White's seahorse is loss of natural habitats ”



Above Dave tagging a White's seahorse underwater

The White's seahorse is known to fall in love as they pair up and mate for life. Throughout the breeding season, the male and female seahorse come together in the early morning and perform a ritual mating dance for several minutes to cement their love.

During their courtship dance, both seahorses will generally change colour becoming much lighter and they will curl their tails together. They will then often rise off the seafloor in an entwining slow dance. If the timing is right, the female will transfer her eggs into the males pouch starting his pregnancy.

The pregnancy in the male seahorse lasts about 21 days. He then gives birth to between 100 – 250 babies that are fully developed miniature seahorses about 8 mm in size. During the breeding season, the

male seahorse can reproduce up to 8 times! There is no parental care after birth, the baby seahorses are on their own. The oldest known seahorse recorded in the wild is a female White's Seahorse called Dawn who has been found to live for up to 6 years at her home in Nelson Bay.



Above Dawn, the world's oldest known seahorse (6 yrs old)

“White's seahorse is known to fall in love as they pair up and mate for life”

In many areas where the White's seahorse normally occurs, the species is now absent as a result of habitat loss. Seahorses require habitats to survive as they provide shelter, camouflage and food. Without these habitats, the seahorses disappear. A new concept has been implemented to help recover seahorse populations in areas where their natural habitat has declined. In a collaborative project between University of Sydney and NSW DPI, artificial habitat units known as ‘Seahorse Hotels’ have been trialled in Port Stephens and have been shown to be very effective in attracting both juvenile and adult seahorses. Over a 12

month period, over 60 individual seahorses were found living on the seahorse hotels and

during the breeding season they were observed mating. As a result of the successful seahorse hotel trial in Port Stephens, it is hoped that this new conservation method can be used worldwide to help repopulate areas where seahorse populations have declined as a result of

“Seahorse Hotels are artificial habitats trialled in Port Stephens to help conserve seahorse populations; they have been successful at attracting juvenile and adult seahorses”

habitat loss. More information on this conservation initiative can be found [here](#).

References:

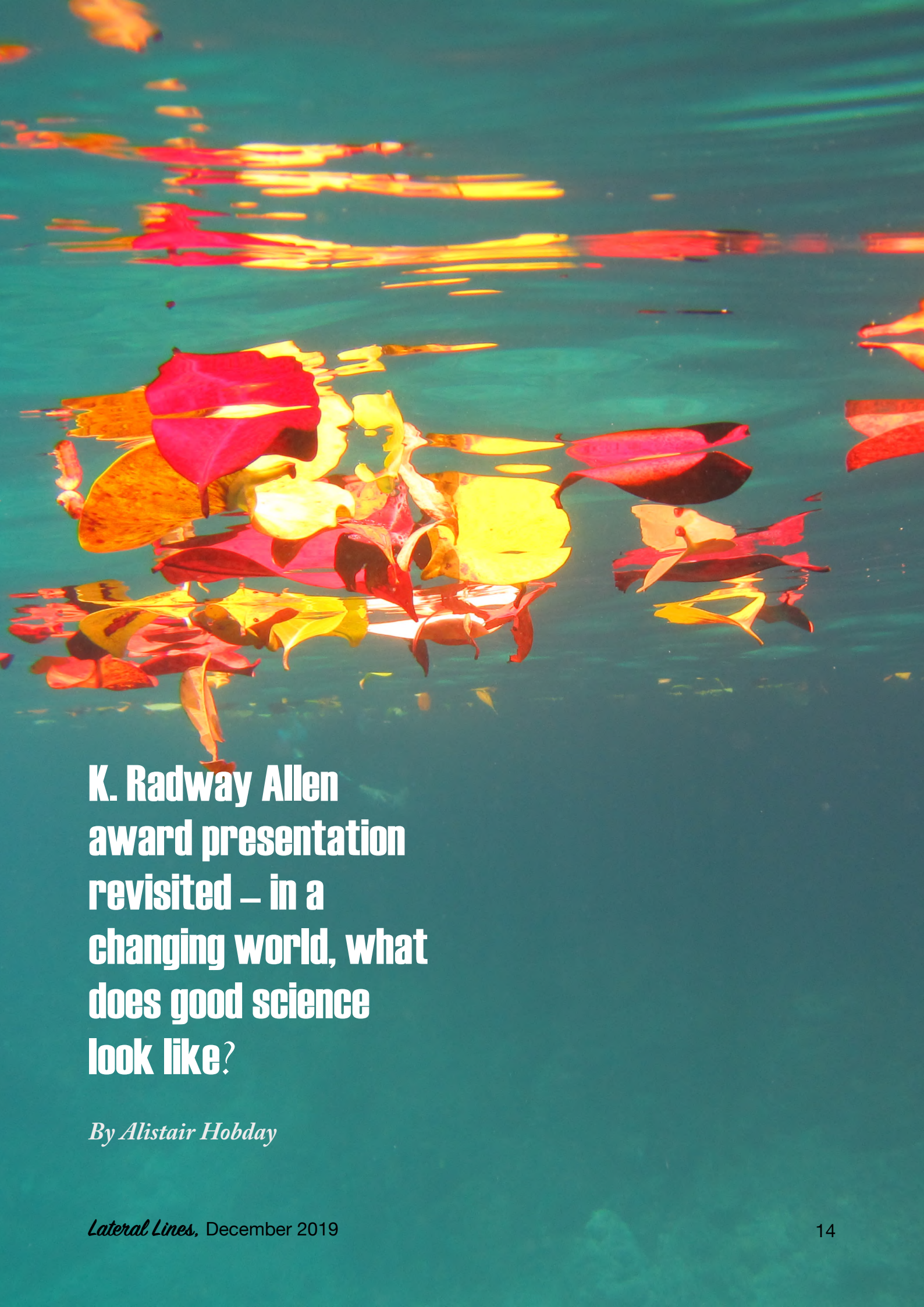
Harasti, D. (2016). Declining seahorse populations linked to loss of essential marine habitats. *Marine Ecology Progress Series*. 546:173-181.

Harasti, D., Martin-Smith, K. & Gladstone, W. (2014). Ontogenetic and sex-based differences in habitat preferences and site fidelity of the White's seahorse *Hippocampus whitei*. *Journal of Fish Biology* 85, 1413-1428.

Simpson, M., Morris, R., Harasti, D. and Coleman, R. (2019) The endangered White's seahorse (*Hippocampus whitei*) chooses artificial over natural habitats. *Journal of Fish Biology*.



Above Adult and juvenile White's seahorse
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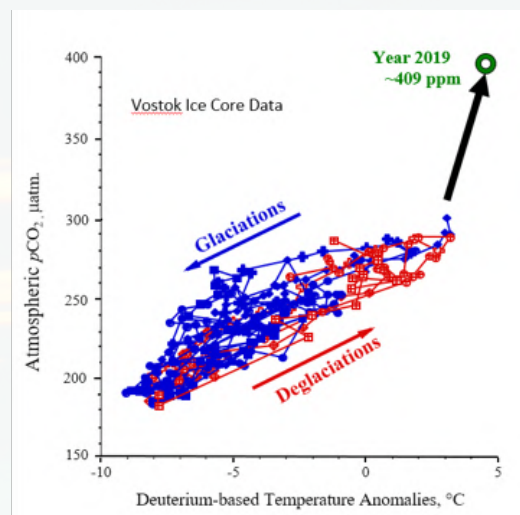
**K. Radway Allen
award presentation
revisited – in a
changing world, what
does good science
look like?**

By Alistair Hobday

In my presentation at the Canberra ASFB meeting, I described how **climate change is already impacting marine and freshwater environments**, in Australia and around the world. Rising greenhouse gas concentrations and increased temperatures are moving the climate system into a new space – unprecedented in the last 800,000 years. The projected changes over the rest of the century and beyond will take the planetary system even further from conditions under which human civilizations have developed. These warmer temperatures, and the extreme events that accompany warming, are already stressing species and ecosystems. Mass mortality of birds, fish, bats and possums, coral bleaching, and die-off of mangroves and seagrass has been reported around Australia in the last decade. Dozens of marine species are moving south along the east and west coast of Australia, and changing rainfall patterns coupled with habitat modification have seen many freshwater species decline. Marine heatwaves are one example of an extreme event that is increasing in intensity, frequency and duration – similarly, floods and droughts challenge freshwater systems.

Good science in a changing world

In the face of this rapid change in the environment, scientists and managers must be prepared to provide advice and make decisions based on the available information. This might mean an increased focus on dynamic management over static management, and that acceptance that models can be used to provide advice, even as they are continually improved. Communication is critical to ensure that information is used appropriately, and to underpin continual adjustment and improvement. Information that is relevant to the time scales for decision-making is desired by many – projections of change by



Above Historical temperature anomalies and atmospheric pCO₂ from the deepest ice core ever recovered at the Russian Vostok station in East Antarctica

the year 2100 are of little use to most managers and policy makers. They need information about the coming weeks and months to support planning. As an example, seasonal forecasts for environmental conditions or habitat distributions are under development for a limited number of fish species, and could be applied more widely.

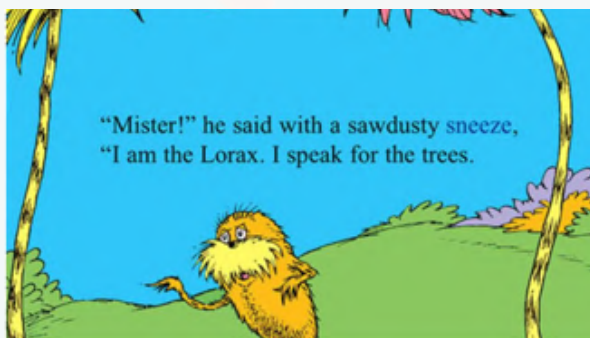
Working on climate change and impacts might lead one to a gloomy outlook, but working on **directed adaptation** – which involves increasing the coping range of species, habitats, or people is a positive way to reduce the impacts of climate change. Since the 2011 ASFB Melbourne conference, where climate change was a symposium topic, much progress has been made with not only listing adaptation options, but deployment and testing of adaptation. Adaptation is not an alternative to mitigation – it is a complement. With the impacts on marine and freshwater fishes already reported, we will need adaptation even if effective greenhouse gas mitigation began today. My work with conservation managers is building their experience with planning, prioritizing, and testing adaptation options. These adaptation bright spots are

important stories to share – and we need more of them!

What can we do about climate change?

Many of us want to know what we can do. In my presentation, I asked how we, as individuals, were responding to the knowledge we have about the impacts of climate change on the ecosystems we value. This was not specifically a call for individual actions (e.g. giving up your car, stop your air travel), or for storming the parliament and demanding better climate policy. I simply hope that the ASFB audience would ponder what each of us might do as an individual, and what as a society ASFB might do. Implicatory denial¹ - when you have knowledge but choose not to act – might not seem as bad as literal denial but it is still a form of climate change denial.

When I talk about climate change, I'm often asked about how our individual actions can form part of a climate response. While individual actions might offset some of our climate guilt, we probably all know that we



Above *What can we do about climate change?*
Cartoon in *The Lorax*, by Dr. Seuss

won't solve the climate problems with these actions. Collectively, there must be top-down responses, including strong policy responses to limit greenhouse gas emission. However, a more nuanced form of denial is now being practiced by leaders who suggest

that individuals must take responsibility, and thus avoid leading coordinated action. This emerging trend was recently described in a Guardian article² reporting recent comments by US climate scientist Michael Mann: "... *the forces of denial are exploiting the lifestyle change movement to get their supporters to argue with each other. It takes pressure off attempts to regulate the fossil fuel industry. This approach is a softer form of denial and in many ways it is more pernicious.*" In other words, a focus on individual actions can be used to defer institutional responses and global action. While we should continue to make individual choices to reduce our carbon footprint, we should not lose sight of the need for strong government action. Coordinated national and global policy and action is needed to minimise the impacts of climate change on the species, habitats, ecosystems that we enjoy, and want to leave for future generations.

Suggested reading:

¹ Walker, I, Leviston, Z. 2019. There are three types of climate change denier and most of us are at least one. [The Conversation](#).

² McKie, R. 2019. Climate change deniers' new battle front attacked. [The Guardian](#).

Babcock, R. C., R. H. Bustamante, E. A. Fulton, D. J. Fulton, M. D. E. Haywood, A. J. Hobday, R. Kenyon, R. J. Matear, E. Plaganyi, A. J. Richardson and M. Vanderkluft (2019). Severe and extensive climate change impacts are happening now: Recent dieback of marine habitat forming communities along 40% of the Australian coast. [Frontiers in Marine Science](#): doi: 10.3389/fmars.2019.00411.

Cvitanovic, C. and A. J. Hobday (2018). Building optimism at the environmental

science-policy-practice interface through the study of bright spots. Nature Communications **9**: 3466. DOI: 3410.1038/s41467-41018-05977-w.

Williams, S. E., A. J. Hobday, L. Falconi, J.-M. Hero, N. J. Holbrook, S. Capon, N. Bond, S. Ling and L. Hughes (in press). Research priorities for natural ecosystems in a changing global climate. Global Change Biology.

Improving fish movement studies in the Murray-Darling Basin: Introducing the Basin-scale acoustic telemetry system

*By Chris Bice, Nicole Carroll,
Wayne Koster, Jason Thiem, Ryan
Woods and Brenton Zampatti*



Movement and habitat use are key life history components that ultimately influence fish population dynamics. Understanding these processes is critical to inform management and conservation; including management of commercial fisheries and designation of protected areas, and in freshwater environments, informing environmental flow delivery and promoting connectivity (e.g. fishway construction). Many approaches exist to study fish movement, from basic methods like observation and mark-recapture, through to more complex techniques such as natural marks in otoliths or electronic tagging. Each have their pros and cons. Electronic tagging, has the capacity to monitor movement and habitat use over spatial and temporal scales relevant to

management, and for this reason, the use of electronic tagging has expanded globally in recent years.

Acoustic telemetry and collaborative networks

Acoustic telemetry is arguably the most versatile of electronic tagging technologies. It can be used in both marine and freshwater environments, and for fishes big and small, from salmon smolts through to whale sharks. Acoustic tags emit a sonic signal that carries a unique ID code that if in the range of an acoustic receiver, will be recorded and logged. Acoustic tags may also collect abiotic (e.g. salinity, temperature) or activity data (e.g. accelerometers), and these specific data are also transmitted to acoustic receivers. The typical acoustic



Above Golden perch are one of several long-ranging fishes in the Murray-Darling Basin and a focus of studies using acoustic telemetry



Left VEMCO acoustic tag and VR2W acoustic receiver ready for deployment. **Top right** Chris Smith downloading a receiver. **Bottom right** Ian Wooden implanting a golden perch with an acoustic tag.

telemetry project therefore involves setting up arrays of acoustic receivers in the environment to record fish presence in their vicinity, and the nature of arrays varies greatly depending on the environment and specific research questions. Nonetheless, the spatial extent of most project-based acoustic arrays is limited to some degree, and for long ranging fish, movements and behaviours that occur outside of acoustic arrays are unknown. Long ranging animals can, and often do, get recorded by receivers of unrelated projects, but sharing of these detection data is often informal and

reliant on relationships between researchers.

In many countries where acoustic telemetry is commonly used, there has been a move towards large-scale collaborative networks. Notable examples are the global *Ocean Tracking Network* (OTN), the *Australian Animal Tracking And Monitoring System* (AATAMS), and the *Great Lakes Acoustic Telemetry Observation System* (GLATOS). These systems provide communal receivers at key locations, whilst project specific receivers contribute to the network and join/leave the system as projects

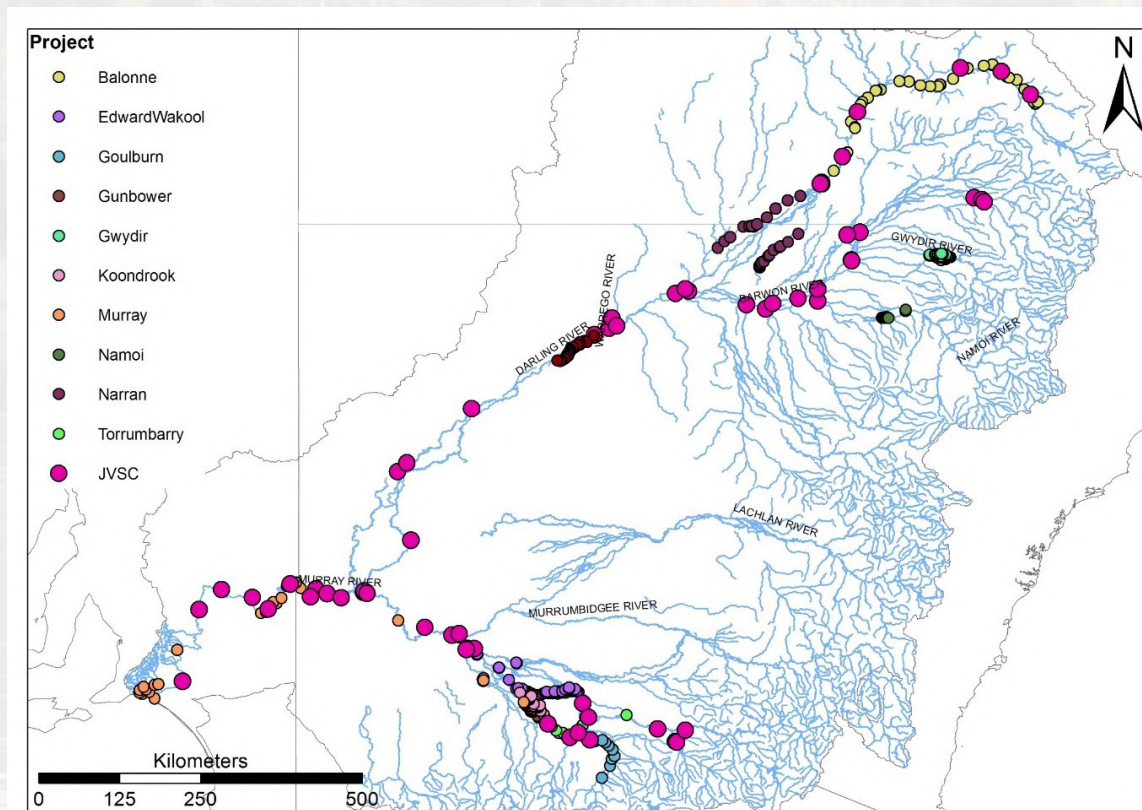
commence or cease. Data is uploaded to central databases which can then be accessed through online portals. Ultimately, these systems aim to collectively broaden monitoring coverage for acoustic telemetry projects, and formalise and streamline data sharing.

The case of the Murray-Darling Basin

The Murray-Darling Basin covers over a million square kilometres, comprising thousands of linear kilometres of rivers and creeks, and economically, is Australia's most important river system. It also harbours many iconic and highly mobile species. Yet, its flow regimes have been altered by water abstraction, to the detriment of fishes. For this reason, rehabilitation of fish populations by promoting connectivity and providing environmental flows is a central tenet of the Basin Plan, and a guiding principal for water managers in the Murray-Darling Basin Authority (MDBA) and Commonwealth Environmental Water Office (CEWO). Because of this, advancing understanding of movement and life history, and using movement data to evaluate the influence of management actions,

are key drivers of research.

Like elsewhere, the use of acoustic telemetry as a research tool has expanded greatly in the MDB. As of 2017, at least 12 active projects across six species were using acoustic telemetry to monitor fish movement and habitat use in the MDB. Consistently, fish tagged in given projects were being detected by the receivers of non-related projects. Formal mechanisms for data sharing did not exist, but rather, sharing was informal and reliant on relationships among researchers. In many instances, this sharing of data allowed important movements and behaviours to be documented that would have otherwise been missed, including movements of individual golden perch (*Macquaria ambigua*) and silver perch (*Bidyanus*



Above Map of acoustic receivers in the Murray-Darling Basin in late 2018. Pink dots are receivers installed as part of the Basin-scale Acoustic System supported by the MDBA Joint Ventures program

bidyanus) of 100's of kilometres, and among different rivers and jurisdictions.

The Basin-scale Acoustic System

The utility of a large-scale, collaborative acoustic telemetry system in the MDB was obvious, and subsequently, a group of researchers from across the Basin states (South Australia, Victoria, New South Wales and Queensland) were successful in receiving funds from the Basin governments to initiate such a system. Specifically, funding was gained through the Joint Venture Monitoring and Evaluation (JVM&E) Program, which coordinates and integrates environmental monitoring and evaluation for mutual benefit. Initial resourcing was provided to purchase 60 communal receivers and formalise the group of researchers (the quad-state team) to guide implementation of the system. Key objectives of the Basin-scale system were immediately identified as: increasing coarse-scale coverage across the Basin by providing a backbone of receivers upon which smaller project arrays can be integrated; providing for easy access and sharing of detection data; and to represent a framework for collaboration among researchers and managers on acoustic telemetry projects. The Basin-scale system consists of two primary elements: 1) the receivers and associated infrastructure, which consists of communal and project specific receivers; and 2) a central database. The system is administered and membership governed by the MDBA on behalf of the JVM&E Program.

Following initial purchase, the communal receivers were deployed in 2018. Guiding principles for deployment were to 'gate' key river-tributary junctions, monitor areas downstream of

key barriers, and fill gaps in previously non-monitored river reaches. As a result, these receivers now cover a linear distance of approximately 5000 km of the Murray and Darling rivers. Project specific receivers are deployed in whatever manner is deemed appropriate by associated researchers, but if they are members of the system, it is expected that these receivers be included in the Basin-scale network to provide detection data. A central database for receiver data, was subsequently developed by Karltek (<http://www.karltek.com.au>) with researchers providing receiver and tag metadata to the administrator, as well as subsequent detection data, following specified templates. For verified users, the database can be accessed online.

Access to data from the system is governed by a set of data management guidelines. These have been drafted and will be finalised in early 2020. Ultimately, members will only have privileges and access to data from tags on projects they are associated with, but from any receiver in the network. Public access and IP rights will be governed by individual grant agreements in addition to the data management guidelines. The ultimate intent of these guidelines is to have all researchers using acoustic telemetry in the basin, government and non-government, to be a member of the system without fear of misappropriation or misuse of data.

The future of the Basin-scale Acoustic System

Since 2018, several projects have benefited from the Basin-scale system. The quad-state team are currently working on a project investigating the influence of hydrology on the initiation of intra- and inter-regional movements

of golden perch in parts of the southern and northern basin. Acoustic telemetry projects will also be undertaken at Living Murray Icon sites in coming years, including at Barmah, Gunbower and Kondrook-Perricoota, Lindsay-Walpolla, and Chowilla, and all will be adding receivers and joining the system.

Additionally, several selected areas under the CEWO Monitoring, Evaluation and Research program will include acoustic telemetry. The system currently includes data from 105 acoustic receivers, but it is hoped this number will grow considerably.

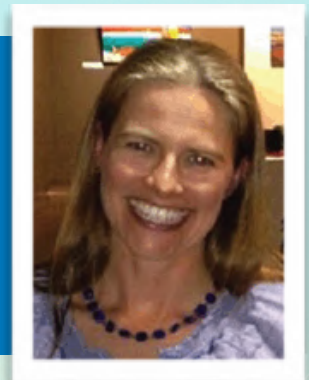
Key steps in 2020 include finalising the data management guidelines and running a workshop with researchers and managers to discuss the direction of acoustic telemetry in the Basin and how it can best be used to answer questions of management. This includes how this technology can be best integrated with other research (e.g. otolith microchemistry) to provide the greatest power to answer broad questions of how movement influences fish population dynamics. Other key topics for discussion will include continuity in future governance/guidance of the system (e.g. formalisation of the quad-state team) and funding. Ultimately, the system is still in its infancy, but with appropriate support, will represent a powerful tool to further understand fish movement and life history, and evaluate the success of management interventions in the Murray-Darling Basin. We encourage researchers currently or considering undertaking projects using acoustic telemetry in the MDB to use this valuable tool and participate in the system.

If you have any queries regarding membership of the Murray-Darling Basin-scale Acoustic System please contact the MDBA JVM&E Program Secretariat or your state-based representative on the quad-state team.

- Murray-Darling Basin Authority: Nicole Carroll (JVSCSecretariat@mdba.gov.au)
- Queensland: Ryan Woods, DES (ryan.woods@des.qld.gov.au)
- New South Wales: Jason Thiem, DPI Fisheries (jason.thiem@dpi.nsw.gov.au)
- Victoria: Wayne Koster, ARI DELWP (Wayne.Koster@delwp.voic.gov.au)
- South Australia: Chris Bice, SARDI Aquatic Sciences (chris.bice@sa.gov.au)

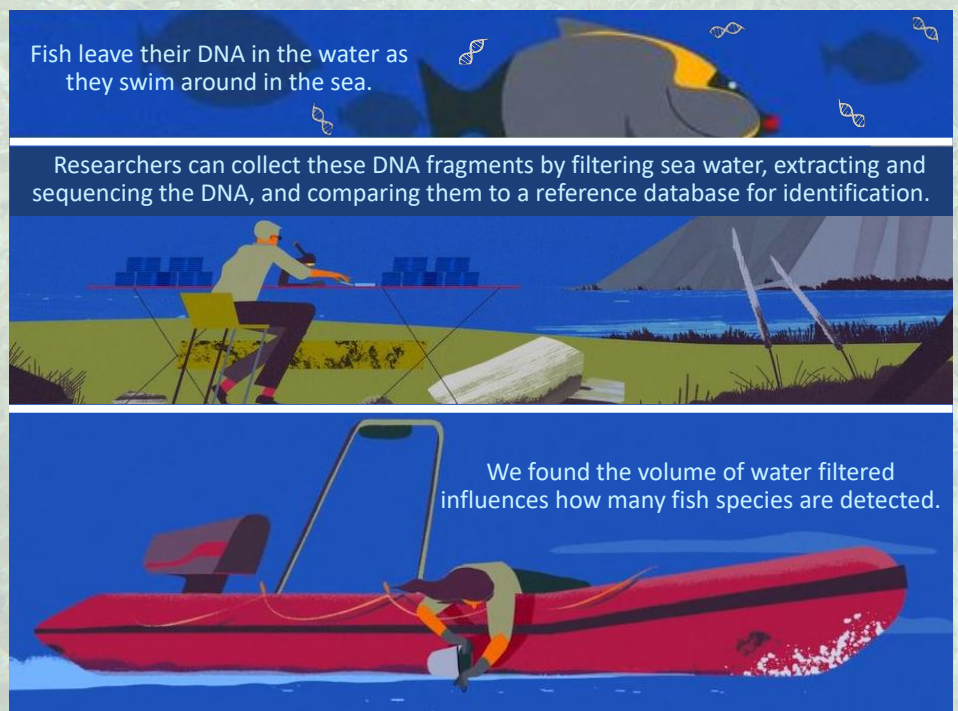
Arts & Science: *Graphical abstract*

In this edition of Lateral Lines, Dr. Cindy Bessey shares with us her recent experience joining arts and science at the 2019 ASFB Conference in Canberra, where she learned how to make a graphical abstract and won an award for it! Cindy is a marine ecologist and research scientist at CSIRO in Perth, WA. She is passionate about understanding the role of lower trophic level organisms in sustaining diverse, productive and healthy ecosystems.



At the recent ASFB Conference in Canberra, Tullio Rossi convened a workshop on how to use graphical abstracts to convey research. I was delighted to attend and learn a few tips about how I might communicate our research in a more creative way. I am a marine ecologist at CSIRO that is working on ways to advance the use of environmental DNA (eDNA) for tropical marine fish biomonitoring, which is a promising non-invasive tool for diversity measurements. Fish continuously expel their DNA as they swim about in the sea, which can be collected and used to determine what species are present in an area. We've been investigating how the detection of fish is influenced by the amount of water that is filtered across a membrane. Our research is suggesting that eDNA in seawater is patchy and that estimates of fish biodiversity are strongly influenced by the volume of water filtered. At the ASFB workshop, Tullio guided us through constructing a graphical abstract and showed us how to turn our scientific research into a tangible story that is accessible to both scientists and the general public. I was lucky to have the permission to use the

brilliant and colourful illustrations of Felipe Vargas, a graphic designer from Santiago, Chile. Felipe's artwork was commissioned by the CSIRO Environomics Future Science Platform. To learn more about our Environomics research, check out [this](#) short animation which features more of Felipe's fantastic artwork. I combined Felipe's artwork, Tullio's tips, and our science into the winner graphical abstract!



Above *Cindy's graphical abstract*

Arts & Science: *Red fish, blue fish*

Dr. Maggie Watson is a lecturer in Ornithology at Charles Sturt University in New South Wales; she has a keen interest in science communication, graphic design and scientific illustration. Maggie was a co-convenor for the 'Fish Art and Imagery Workshop' at the 2019 ASFB Conference in Canberra. Here, she shares a bit of curious scientific illustration history with some creative story-telling fish style!



Louis Renard's book, *Poissons, Ecrevisses et Crabes* (Fish, Crayfish and Crabs of Diverse Colours and Extraordinary Form, That Are Found around the Islands of the Moluccas and on the Coasts of the Southern Lands), was intended to be an overview of East-Indian fishes (modern day Indonesia) and push the boundaries of science with its new and innovative approach—colour plates! It was published first in 1719 and contained 100 plates comprising 460 hand coloured engravings. In total, 415 fishes, 41 crustaceans, two stick insects, a dugong and a mermaid are presented in spectacular technicolour. The work contains no text apart from the descriptions on the plates, some of which are accompanied by recipes. It is a beautiful and bizarre early attempt at scientific illustration.

How did one man find the time to survey these fish, draw them, paint them and publish a book?

In fact it took about 30 years, during which Renard was a publisher, pharmacist, an English bond broker, and a spy Britain working against James Stuart. In reality, Louis Renard wasn't even the artist or the scientist who collected the fish, he was the publisher who procured illustrations from other people (such as the Dutch East India Company soldier Samuel Fallours) and then redrew them for the book. He apparently had no eye for colour, and may have randomly chosen his colour palette.

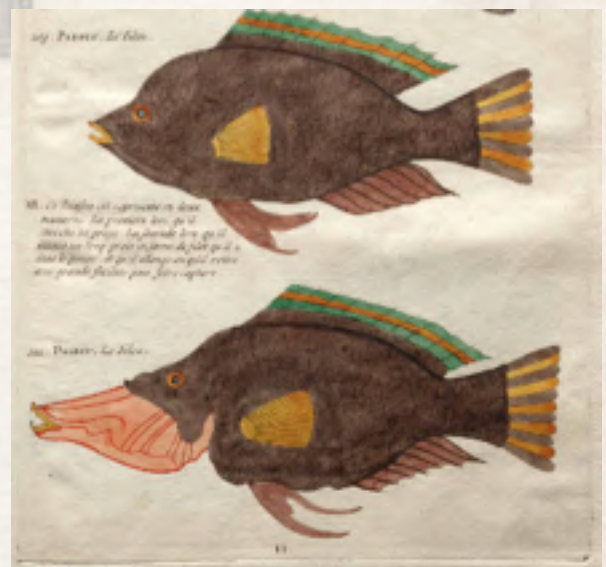
Despite Renard's artistic license, many of the fish can be identified to species, although perhaps not the mermaid...

Here are some of the images from Renard's amazing book, and a bit of Dr Seuss, too (slightly altered to fit).

One fish (this one is actually very realistic...),



Two fish (the same, but different),



Red fish (with suspiciously non-random spots),



Blue fish (I swear that is the Belgian flag on its tail),



Black fish (now this is a worthwhile fish),



Odd fish (a crab, actually, and is that a flower motif on its back?),



Not a fish (but spectacular, nonetheless)



These ones have little faces.



This one is quite bizarre.



Say! What a lot of fish there are.

To view the entire digitised book, visit <http://www.rarebookroom.org/Control/rndwar/index.html>

General News and Information



Australian Society for Fish Biology Information

The Australian Society for Fish Biology was founded in 1971 with the intention of promoting fish studies and the interchange of information between fish biologists in a relaxed but effective manner. Annual Conferences have been held once every year since the Society's inception. They are now the highlight of the Society's calendar, providing a forum for members around Australia to meet and discuss their work.

Since the first conference conducted by the Society in its own right, at Port Stephens in 1975, succeeding conferences have continued to be conducted most successfully, and in a relatively informal atmosphere despite consistent growth in both attendances and programs.

To enhance its contribution to research, conservation and management of fish and their habitats in Australia, the Society decided to organise and hold workshops on specific topics in conjunction with its annual conferences. The first such workshop, a two-day event on *Australian Threatened Fishes*, was held at the Arthur Rylah Institute, Melbourne, immediately prior to the Society's annual conference held in that city in 1985.

In addition to these major workshops, another series of workshops on fish collection management, organised independently by museum-affiliated members but held under the auspices of the Society, was initiated with a one-day

program immediately after the 1985 Melbourne conference.

The Society now publishes a bi-annual newsletter, which was recently baptised "Lateral Lines" after a naming competition ran with all ASFB members and which was won by Christopher Fulton, ASFB President from 2015 to 2017. The newsletter contains information of interest to the Society membership, including notices and information on Society activities, and a bibliography of publications by Society members. The proceedings of Society-held workshops are usually produced separately as special publications, often with the assistance of other government and non-government organisations.

Please check our frequently updated website for any news or current job positions <http://www.asfb.org.au/>, and follow us on social media via our Facebook and Twitter accounts.

The Society membership has expanded from 79 members in 1971 to 438 members currently.

Membership

Applications for membership are invited from any person interested in the aims of the Society (as set out in the constitution) or any institution wishing to receive the Society's newsletter and other publications. The membership application is through the website (<https://members.asnevents.com.au/login/>) with credit card online payment options.

Membership of the Society entitles all members to discounts for conference registrations and access to download the newsletter and conference proceedings from the website. Members who are non-financial for more than 12 months will forfeit the benefits of membership and be removed from the membership database.

There are three membership categories:
Student Member:

One Year \$30.00
Three Years Not avail.

Ordinary Member:

One Year \$60.00
Three Years \$150.00

Retired Member:

One Year \$30.00

Institutional Memberships are also available by contacting the Membership Secretariat at: <http://www.asfb.org.au/contact-us/>

Office bearers and half of the Executive Council are elected from the membership at the Annual General Meeting, held during the Annual Conference.

Pay Your Membership & Update your Membership details

The Society requires your details to be registered online. We must have your current contact details and e-mail address in order to send out ASFB communications. Please make sure you pay your subscriptions promptly and contact the Membership Secretariat at: <http://www.asfb.org.au/contact-us/>.

Science & Technology Australia 2019 Highlights



Apply now to become a STEM Ambassador!

Science & Technology Australia has launched the second round of its STEM Ambassador program, with **applications closing midday on December 24, 2019.**

STEM Ambassadors receive training and support to work directly with their local MPs to promote understanding of science and technology, and support the involvement of science in Australian politics and decision making.

The program lasts for 12 months. Ambassadors are trained in effective engagement and communicating science to parliamentarians, building networks, media engagement, social media and science advocacy.

“STEM professionals who are keen on getting more involved in policy and political decision-making should seriously consider applying to be a STEM Ambassador” - said STA Chief Executive Kylie Walker.

More information [here](#)



Science meets Parliament supports Deadly Science

Science meets Parliament 2019 is proud to support Deadly Science, an important initiative expanding access to science for Indigenous kids. In lieu of gifts for the Science meets Parliament speakers, STA donated \$20 in the name of each speaker to their cause.

Deadly Science provides remote schools with books and scientific resources, and connects young Indigenous Australians with mentors to inspire their participation in STEM.

Founder of Deadly Science Corey Tutt is a member of STA's inaugural Equity, Diversity and Inclusion Committee. Corey works hard to source funds and donated books. So far, he has distributed more than 4,000 books and 70 telescopes to schools nationwide – an amazing achievement to encourage scientific exploration and ignite curious minds.

[Learn more about Deadly Science or donate here.](#)



Separation of Science and the State

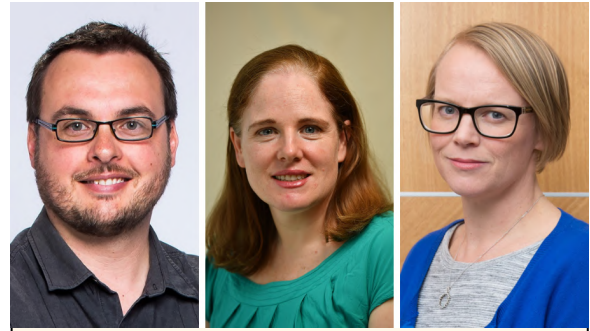
Professor Emma Johnston AO President, Science & Technology Australia and Kylie Walker CEO, Science & Technology Australia

There's been a concerted effort over the last few months to point out that science isn't perfect. We agree that science isn't perfect, but it is a set of transparent methods for getting at the truth. Imperfection and a desire for constant growth and improvement is the very thing that drives scientific endeavour.

Admitting you don't know is the first step to learning more – and this kind of honesty, which is embedded in scientific endeavour, underpins deep integrity, and rigorous systems designed to test, re-test and test again to ensure the advancement of scientific knowledge is based on fact, rather than assumption or wishful thinking.

To berate science for identifying and rectifying its mistakes is to silence scientists. And that is deeply dangerous, because if we silence the people presenting rigorously-obtained new knowledge, then fear, myth, conjecture and assumption rush in to fill the gap. Scientists and scientific institutions **MUST** be enabled to provide frank and fearless advice to government and to the public. Because when scientists are afraid of speaking up, people, economies and environments are put at risk.

The people, and their political and business leadership, absolutely deserve to *know*. To know about the challenges they are facing, and to know about how to tackle them. We absolutely need a culture in which scientists are encouraged to share what they know with others, to provide frank and fearless advice to the government and to the people.



Our very own Chris Fulton gets appointed as a new STA Board member

Science & Technology Australia, the peak body in science and technology representing more than 75,000 Australian scientists and technologists working across all scientific disciplines, appointed three newly elected members to its Board in October 2019:

- Aquatic Sciences – **Associate Professor Christopher Fulton**; *Australian Society for Fish Biology, Australian Marine Sciences Association*
- General Sciences – **Dr Kathy Nicholson**; *Australian Optical Society, Women in STEMM Australia, Centre for Nanoscale BioPhotonics*
- Medical and Cognitive Sciences – **Dr Karen Gregory**; *Australasian Society of Clinical & Experimental Pharmacologists & Toxicologists*

These new members bring a rich diversity of talent, skills and experience. Chris Fulton is a Senior Fellow of the Higher Education Academy, a past President of the Australian Society for Fish Biology, and a passionate advocate for the role of evidence-based decision making in solving the most pressing challenges facing our society.



Ichthyology Hall of Fame: K. Radway Allen Award Recipient 2019 Dr. Beth Fulton

By Harry Balcombe (Griffith University)

Dr Beth Fulton is a worldwide renowned scientist recognised for her exceptional contribution to marine socio-ecological systems understanding and management. However, her life started inland, with Beth growing up on a small rural property outside Goulburn, NSW. Always inquisitive Beth enjoyed her family's seaside holidays and inspired by an encounter with dolphins age 15 she turned from a future aimed at veterinary science to marine biology. This decision has taken her all round Australia and the world. She considers herself immensely lucky to be able to work in a field she loves, that has provided her with so many wonderful

experiences and that she has been supported at every step by (in her words) “an amazingly tolerant and understanding family, who have shared their lives with, and often lovingly mocked, her scientific obsessions”.

Beth is a strong believer in models' power to provide better understanding of the complexity and uncertainty associated with marine ecosystems and ultimately, influencing their management. Her outstanding educational background in Mathematics, Statistics and Marine Biology (BSc First Class Honours in Mathematics and Marine Biology, James Cook University, Townsville, 1997) and PhD on ‘The

effects of the structure and formulation of ecosystem models on model performance' (University of Tasmania, 2000) set the basis for a career that has seen Beth become a world leader in the holistic management of marine ecosystems. Indeed, since joining the CSIRO in 2001, Beth developed Atlantis, a whole system modelling platform dedicated to marine fisheries management and a recognised tool by the United Nations Food and Agriculture Organization. Beth also co-developed the 'InVitro' and 'Corsa' computer models, which allow users to explore the impacts and management of the myriad pressures on marine and coastal environments. Both Atlantis and *InVitro* were the first models in the world to give equal attention to biophysical and human components of marine ecosystems. Corsa takes lessons from those models to provide a means of looking at coastal systems, connecting activities on land and in the sea.

Dr Fulton has an impressive publication record, not just in breadth with more than 160 peer reviewed publications and book chapters (also including Nature and Science articles) and has been cited over 10,000 times. During her 20-year career, Beth has contributed to scientific knowledge development in fields encompassing participatory modelling, trophic networks and ecosystem dynamics, integrated management, economic and social drivers of maritime activities, governance, amongst others. Beth also extends her communication to the general public through publications in media communications such as "The Conversation" and other main-stream outlets.

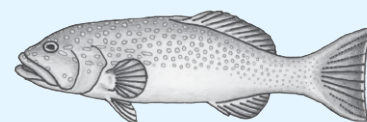
Beth is not only an accomplished scientist, but also a committed actor in the research field, exercising different roles from serving as an editor on Conservation Letters, Ecology & Society and Socio-Environmental Systems Modeling and a Guest Editor for Journal of Marine Systems (2011-2012), PLoS Computation (2012) and Frontiers in Marine Science (2018-2019). She was also on the organising committee for AMEMR II and III conferences (2008, 2010) and for EwE 25th



Above Beth at a tree-house in India; one of the many places where her career as a marine scientist has taken her

Anniversary Symposium (2008-2009), as well as the Research Advisory Board of VECTORS (2010-2013), Steering committee chair for the IMBER summer school on ecosystem modelling (2011-2012), a Member of Antarctic Science Advisory Committee, a review editor for IPBES and a contributing author for the IPCC, UN SEEA and IOC review of the SDGs.

Not only an outstanding scientist, leader and communicator, Beth is also dedicated and passionate in forming and inspiring future scientists in marine sciences (for example she has participated in the IMBeR summer school program since 2011, as well as post-graduate lecturing and supervision). She is described by her peers and students as an approachable individual, dedicated and considerate, and a talented lecturer and



supervisor, guiding and enabling students to develop their own projects and leadership skills. Further, as an inspiring female in a currently male-dominated industry, Beth is recognised as a great mentor and role-model for young women navigating through their early career as fisheries scientists and managers.

The quality of Beth's work and contribution to marine fisheries management has been rewarded by a number of prestigious awards starting with a recognition of her exceptional university studies - i.e., Ron Kenny Prize in Zoology (1994), Townsville Port Authority Prizes in Marine Science (1995), Palmerston-Rundel Prize for Best Honours in Biological Sciences and the University Medal in Marine Biology and Mathematics and Statistics (1997), Dean's commendation for outstanding PhD by research (2002) and the Royal Society of Tasmania's award for an outstanding PhD (2004). Further awards from the Australian Government and the scientific community include the Science Minister's Prize for Life Scientist of the Year (2007), Pew Marine Science Fellowship (2010) and the ESA Sustainability Science Award for work on the global assessment of fisheries status (2011).

When considering Beth Fulton's outstanding contributions in protecting and conserving marine ecosystems through the development of holistic marine fisheries management tools, collaborating with and guiding scientists, worldwide, and also in forming tomorrow leaders in marine sciences, she is a most deserving recipient of the KRA award.

For her outstanding contributions to Ichthyology Dr Beth Fulton was awarded the K. Radway Allen Award for 2019 by the ASFB. Congratulations to Dr. Fulton!

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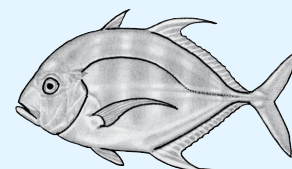
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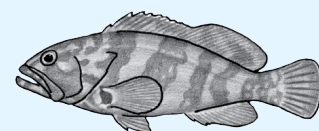
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ASFB 2019 CONFERENCE REPORT, CANBERRA

Communicate to illuminate & Inspire

By Chris Fulton
Chair, 2019 ASFB Conference Organising Committee

Photos By Rosie Harris & Zoe Doubleday

Our 2019 Annual Conference in Canberra encouraged the 251 delegates (including 62 students) from across Australia, New Zealand, Europe, South Africa, the USA and Fiji to find new ways to share our passion for fishes, and raise their profile among the many people who

depend on them for their everyday health and wellbeing. The opening reception in the spectacular lobby of the conference venue – the National Library of Australia – included an official launch by the Assistant Minister for Forestry & Fisheries Senator The Hon Jonathon Duniam, who stayed on and quickly got into the spirit of good communication (see picture).

During the first morning of talks delegates were treated to a masterclass of six plenary speakers in the *Communication in Fish & Fisheries Forum*,



Left Delegates getting into the spirit of good communication at the ASFB 2019 Canberra welcome reception, which was officially opened by Senator The Hon Jonathon Duniam (inset, flanked by ASFB Presidents past, present & future).



Left Delegates getting into the spirit of good communication at the ASFB 2019 Canberra welcome reception, which was officially opened by Senator The Hon Jonathon Duniam (inset picture, flanked by ASFB Presidents past, present & future).



which explored the use of video and graphical abstracts to unleash the impact of their work (Dr. Tullio Rossi), the fine art of scientific illustration for taxonomy (Dr Lindsay Marshall) and conservation communication (Dr. Erin Walsh), the ingredients for effective communication of your science to your target audience (Stella McQueen & Dr. Tom Rayner), and reimagining our approach to science writing (Dr. Zoe Doubleday). A lively question-answer session with the full panel of speakers generated plenty of discussion during the forum, the tea breaks and special-session question times.

Energised to speak up and show their wares, delegates engaged with the main conference program that included three more outstanding plenaries by ASFB Award Winners – Dr. Alistair Hobday (2018 KRA Award), Dr. Kirsty Nash (2018 Early Career Excellence Award) and Dr. Tiffany Sih (2018 Student International Travel Award) – and 178 talks and poster

presentations within the 15 conference special sessions. In two of the largest special sessions – Aquageography & Fish Kills – the presentations were followed by question-answer forums that allowed the audience to talk with presenters and dig deeper into these hot topics.

Another headline event during the conference was our free public forum with the moniker *Big Messages for Decision Makers* attended by 228 delegates, VIPs and members of the public. Our public forum presenters shared insights into the problems and solutions to mass fish kills and the loss of cultural connections in the Murray-Darling, seafood mislabelling, tracking fish movements at oceanic scales, making the most of big data in fisheries, and communicating with people who deny the need for science and conservation.

Extended tea and lunch breaks gave plenty of time for catch-ups with old and new friends, as



Above ASFB2019 Big Messages Public Forum explored solutions to some of the big problems facing our fishes and the people who depend on them.

well as two extremely well attended events. The first was the fish pub quiz that pitted the brains of 164 fish-heads in 10 teams to answer a spread of gritty and quirky questions (Can fish fart? You should have been there to find out the answer!). The final event was the conference dinner at the National Gallery of Australia, where 201 delegates enjoyed local food and drinks while enveloped within the wonderful soundscape provided by *Scroggin*, which got people doing backflips on the dancefloor after dinner.

Delegates who could take advantage of a pre-conference workshop were delighted with the new skills they'd gained in communicating their work through the arts, visual abstracts, developing a comms strategy, and/or exploring new dimensions in their approach to writing. Attendees had the chance to show off their design skills by submitting entries to the ASFB2019 graphical abstract (GA) competition. A competitive pool of 21 submissions made it hard to choose the most outstanding GAs in the student (Tristan Guillemain), early career (Dr. Kylie Scales) and general (Dr. Cindy

Bessey) categories, with a \$500 cash award for each winner.

The success of our 2019 conference events was possible by the wonderful support from ASN Events staff (special mention to Ruby Hatfield), and the fantastic sponsors who contributed \$96,000 to our event, including major sponsors the FRDC, CSIRO, NSW Recreational Fishing Trust, Icon Water and the ACT Government. The organising committee used this support to expand the conference events, support attendance by key stakeholders and the public, and boost the quality of our social events within a balanced budget.

As one of the smallest jurisdictions in the ASFB, this conference would not have been possible without the dedication of these people over the past year – Harry Balcombe, Steve Beatty, Matt Beitzel, Ben Broadhurst, Sherrie Chambers, Brendan Ebner, David Ellis, Elise Furlan, Rhiannon Jones, Paula Kalinowski, Andrew Katsis, Emily Lester, Nathan Miles, Mae Noble, Rachael Remington, Katie Ryan, and Robert Streit – a diverse and creative bunch of people who



Above Conference awards, great music, food and conversation being enjoyed by delegates at the ASFB 2019 conference dinner at the National Gallery of Australia

strived to provide an enjoyable conference that broke new ground for the ASFB in terms of event sustainability while ensuring gender and career diversity among our key speakers and session chairs.



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Abstract submissions are invited for the World Fisheries Congress 2020, providing a valuable opportunity to present your work to a global audience.

From 11-15 October 2020, leading global fisheries experts will converge on Adelaide, Australia for one of the largest international fisheries conferences, World Fisheries Congress 2020 (WFC2020). The annual ASFB Conference will be merged with this important event.

WFC2020 will bring together research, industry, management and the latest technological advances in marine and freshwater fisheries worldwide, under the overarching theme '**Sharing our oceans and rivers – a vision for the world's fisheries**'.

ABSTRACT GUIDELINES

The WFC2020 International Program Committee welcomes abstract submissions in all areas related to global fisheries issues and key developments needed to ensure a sustainable future for our oceans, lakes, estuaries and rivers, including commercial, recreational and Indigenous fishing communities.

Abstracts can be submitted under a list of topics that are organised around four key themes:

- Sustainable Fisheries (Assessment, Regulation, Enforcement)
- Fish and Aquatic Ecosystems (Biodiversity, Conservation, Ecosystem Function, Integrated Management)
- Fisheries and Society (Contributions to Sustainable Development)
- Future of Fish and Fisheries (Innovations in Fisheries)

The breadth of topics represent expressions of interest received from the global fisheries community.

Abstracts for oral or poster presentations must be submitted online via the WFC2020 Abstract Submission Portal and follow the Abstract Guidelines.

Abstract submissions close 31 January 2020.

For full details, visit wfc2020.com.au/call-for-abstracts

About WFC2020

Held every four years, WFC2020 provides a global platform to discuss major issues facing world fisheries. WFC2020 will deliver insightful presentations and inspiring forums that:

- showcase and demonstrate new technologies
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- promote uptake and extension of research
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To find out more about the Congress and register for updates visit

State Reports

NORTHERN TERRITORY-NT

Compiled by Krystle Keller & Michael Hammer

Developing Artificial Intelligence for fisheries monitoring

By Andrew Jansen, Steve van Bodegraven and Shane Penny (Department of the Environment and Energy, Supervising Scientist Branch, Darwin NT; Microsoft, Australia; Department of Primary Industry and Resources, Darwin NT)

The Supervising Scientist Branch (SSB) has monitored freshwater fish community composition in Kakadu's Billabongs for 30+ years. Monitoring was initially performed using a visual observation platform or netting of fish depending on habitat or billabong type. As crocodile activity increases in the region, monitoring methods have transitioned to a videography based platform to safely meet operational requirements. Videography allows increased sampling effort spatially and temporally whilst decreasing the number of staff and hours spent in the field. This comes with its own challenges and requires staff to process hours of footage.

Artificial Intelligence (AI) or Deep Learning Models are capable of automating the identification of fish species from imagery. With a recent proof of concept shown by Dr Shane Penny's team within the Department of Primary Industry and Resources in Darwin Harbour using baited BRUV cameras on targeted species, SSB has joined this partnership with Microsoft to transfer those learnings into a model capable of characterising freshwater fish community



Top Georgetown Billabong, Kakadu National Park (Shallow Lowland Billabong) **Centre** Surface camera deployment and visual observation fish surveys (Duncan Buckle and Mark Ellis) **Bottom** *Toxotes chatareus* (Polyline) and *Amniataba percoides* (Bounding Box) image labelling ; photos ERISS

composition in Kakadu's billabongs.

One of the biggest challenges faced is the number of hours required to label fish images used to train a deep learning model. The faster yet 'noisier' approach of bounding boxes works well for individual fish, however can struggle with schooling fish species. The preferred polyline or masking approach, the gold standard, requires significantly longer time spent labeling.

Labelled datasets exist for other computer vision objectives but no such open sourced dataset exists for Australian fish. This highlights the need for a national repository or database where fisheries managers can collaborate and share their labelled imagery.

BRUVNET, analogous to ImageNet or COCO, is a solution to this problem! It is an open sourced repository for researchers to contribute to and use. Through model sharing and transfer learning, it will significantly reduce the number of labelled images required for specific problems.

Looking to contribute and work in this space? Contact Andrew.jansen@environment.gov.au for more information.

The NT's Aquarium Fishery

By Brian Boyle, NT Fisheries

The NT Aquarium fishery is a small-scale multi-species fishery that prospects freshwater, estuarine and marine habitats to the outer boundary of the Australian Fishing Zone (AFZ). Fishery licences became transferable in 2008 to enable new operators to enter the fishery. The fishery supplies a wide range of aquarium fishes and invertebrates to local, interstate and international pet retailers and wholesalers.

In recent years the fishery has transitioned from predominantly harvesting freshwater species, to increasing collections of marine fish and invertebrates. As a consequence there is a lack of historical catch data for the new target species, especially hard coral (CITES listed) species, which has required a precautionary approach in



Top The harvest of corals and other marine species is predominantly undertaken by divers on hookah gear in the NT **Bottom Hand** harvesting of *Cladiella*, a soft coral species from a NT offshore reef

applying highly conservative triggers to harvest limits.

Current Research in the NT Aquarium Fishery:

In addition to the FRDC project (2014/029 - Establishing baselines and assessing vulnerability of commercially harvested corals across northern Australia,) that is nearing completion, NT Fisheries has submitted a new EOI with FRDC which has been supported in principle to investigate the impact of commercial harvesting on hard corals species in the NT. This project aims to fill the gaps of the FRDC 2014/029 project. Our project will aim to incorporate aspects of detecting the effects of harvesting, recruitment and some growth rates. It is hoped that this data, specific to the NT, will provide tangible results which industry can use to manage the sustainable harvest of hard corals

in the NT and inform the future harvest strategy for the fishery.

NT Fisheries is also undertaking a project to estimate the extent of live rock cover at the Vernon Islands, an area of relatively high harvest, using imagery and classified maps sourced from the Department of Environment (NTG).

Ensuring biosecurity in NT waters

By Natalee Leader, NT Fisheries

NT Fisheries' Aquatic Biosecurity Officers conduct marine pest monitoring around Darwin Harbour. Settlement collectors (devices designed to encourage marine organisms to settle and grow) are analysed for the presence or absence of marine pests and the species diversity is recorded for each site. Common native organisms sighted include barnacles, oysters, sponge, hydroids, colonial and solitary ascidians, serpullids, sabellids, algae, encrusting and branching bryozoans.

The settlement collectors are inspected every three months. They are located at Darwin's four enclosed marinas (Bayview, Cullen Bay, Tipperary Waters and Frances Bay Mooring Basin), and at five open water sites in Darwin Harbour (Cullen Bay Pontoon, HMAS Coonawarra Larrakeyah Naval Base, East Arm Wharf, Stokes Hill Wharf and Fort Hill Wharf). During NT Fisheries' recent inspection, no species of concern were found.

In addition, NT Fisheries work in collaboration with regional stakeholders to inspect, photograph and collect the settlement collectors.

Above *Natalee Leader inspecting a Marine Pest Monitoring devices at Frances Bay Mooring Basin and Right Cullen Bay Marina; photos NT Fisheries*



The sites selected are located at Wickham Point, Blydin Point, Melville Island, Gove and Alligator River.

If you think you have spotted a marine pest, you can report it by contacting the Fishwatch Hotline on 1800 891 136 or download the NT Fishing Mate app.

New tiny goby discovery in the Northern Territory (and WA)

The latest big discovery in fishes at the Museum and Art Gallery of the Northern Territory (MAGNT) is one of the smallest species to be recorded in Top End waters. A new tiny species, less than 2.5 cm, was found to inhabit sand areas near coral reefs of the Northern Territory and Western Australia. The fish was named Larson's Tiny Sandgoby (*Grallenia larsonae*) in honour of Emeritus Curator of Fishes Dr Helen Larson



for her extensive contribution to goby taxonomy and systematics, and who collected and carefully preserved most of the type specimens during a MAGNT survey to Cobourg Peninsula in the early 1980s (now Garig Gunak Barlu National Park).

Freaky fish and citizen science

In February ABC News Darwin broke a story of a 'freaky fish' caught at Shady Camp on the Mary River east of Darwin, which was identified by MAGNT Curator of Fishes as a Worm Goby. The article went on to have 10,000 plus direct shares across various sites and platforms globally, with the catchy animal 'hook' drawing parallels to the creature in the 1979 Ridley Scott classic *Alien*. At the heart of the article was MAGNT expertise and details of our Worm Goby Citizen Science Project with details of how to contribute. The ongoing promotion of this project helped to raise a dozen new reports of these rarely seen animals (Gobiidae: Amblyopinae). Follow the story [here](#), and refer to image in next page.



Top Emeritus Curator of Fishes Dr Helen Larson at her home office, June 2019 (photo: Jeff Larson) and **Above** Larson's Tiny Goby *Grallenia larsonae* named in her honour (photo: Gerry Allen)

Charles Darwin University update

Dave Crook and Alison King have moved down south to the Centre for Freshwater Ecosystems at La Trobe University in Albury-Wodonga, but are still working on a number of projects at CDU for the next few years. Krystle Keller has

recently returned back to work after the birth of her first child, and is settling back in well with writing up various project outputs and data analyses. Osmar Luiz is still playing with various fish datasets and coming up with wonderful new analysis techniques.

The Black jewfish team (CDU, Australian Institute of Marine Science (AIMS) and NT Department of Primary Industries and Resources) have been busy wrapping up their first year of field sampling. Black jewfish (*Protonibea diacanthus*) are a key species supporting the commercial sector of the NT Coastal Line Fishery as well as an important recreational and Indigenous target fishery. The FRDC-funded project aims to identify drivers of productivity and recruitment, as well as investigating abundance and size structure of populations. This season a huge amount of field days has been achieved by Jo Randall, Brendan Adair and Dion Wedd. The team has been working closely with local commercial and recreational fishers to collect a range of fish samples at our Tiwi Island and offshore Daly River and Mary River sites, as well as a suite of environmental parameters. We are looking forward to developing some preliminary findings over the coming wet season.

Student update: Janine Abecia has been investigating the cost of undertaking mouthbrooding as a life history strategy in Top End River fishes for her PhD. Mouthbrooding is a novel life history strategy in fishes, but has inherent risks and benefits in both adults and their young. Janine has been busy in the laboratory measuring fish and has recently conducted another field trip to collect more breeding catfish. Amy Kirke is loving being a shark biologist and is spending most of her time at the NT Fisheries labs processing shark samples. Kyle Tyler, Brien Roberts and Bryan Baker are head down analysing and writing up their theses- we wish them well!

Published papers:

Grubert M. A. (2019). Catch, discard and bycatch rates in the Western Gulf of



Above The worm goby from Shady Camp that ‘broke the internet’ – part of a citizen science project at MAGNT; photo: Renea King

Carpentaria Mud Crab Fishery: summary for 2017 and 2018. *Northern Territory Naturalist* **29**:88-94.

Grubert M. A., Walters C. J., Buckworth R. C. and Penny S. S. (2019). Simple modeling to inform harvest strategy policy for a data-moderate crab fishery. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* **11**:125-138.

Hammer MP, Allen GR, Martin KC, Adams M & Unmack PJ (in press) Two new species of dwarf rainbowfishes (Atheriniformes: Melanotaeniidae) from northern Australia and southern New Guinea. *Zootaxa*.



Left CDU Research Assistant Brendan Adair landing a Black jewfish in preparation for sampling; photo J. Randall

Hammer MP, Adams M, Thacker CE, Johnson JB & Unmack PJ (2019) Comparison of genetic structure in co-occurring freshwater eleotrids (Actinopterygii: *Philypnodon*) reveals cryptic species, likely translocation and regional conservation hotspots. *Molecular Phylogenetics and Evolution*, e106556.

Hammer MP, Skarlatos Simoes MN, Needham EW, Wilson DN & Barton MA (2019) Establishment of Siamese Fighting Fish on the Adelaide River floodplain: the first serious invasive fish in the Northern Territory, Australia. *Biological Invasions* 21: 2269–2279.

Luiz O.J., Olden J., Kennard M., Douglas M., Crook D., Saunders T., King A.J. (2019). Does a bigger mouth make you fatter? Linking intraspecific gape variability to body condition of a tropical predatory fish. *Oecologia*. <https://doi.org/10.1007/s00442-019-04522-w>

Luiz O.J., Olden J., Kennard M., Douglas M., Crook D., Saunders T., King A. (2019). Trait-based ecology of fishes: a quantitative assessment of literature trends and knowledge gaps. *Fish and Fisheries*. <https://doi.org/10.1007/s00442-019-04522-w>

onlinelibrary.wiley.com/doi/abs/10.1111/faf.12399.

Roberts B., Morrongiello J., **King A.J.**, Morgan D., Saunders T., Crook D. (2019) Migration to freshwater increases fitness in a partially diadromous fish. *Oecologia*. <https://link.springer.com/article/10.1007/s00442-019-04460-7>.

Humphries P., **King A.J.**, McCasker N., Kopf R.K., Stoffels R., Zampatti B., Price A. (In Press, Accepted May 2019). Riverscape recruitment: a conceptual synthesis of drivers of fish recruitment in rivers. *Canadian Journal of Fisheries and Aquatic Science*. <https://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2018-0138#.XSvGkCBS9hE>.

QUEENSLAND QL

Compiled by Mischa Turschwell

Australia Rivers Institute (ARI), Griffith University

By Angela Arthington

Angela Arthington is co-editing a Special Issue of the Proceedings of the Royal Society of Queensland (PRSQ) on 'Springs of the Great Artesian Basin' (GAB) (Editors Renee Rossini, Angela Arthington, Steve Flook, Sue Jackson, Moya Tomlinson, Craig Walton), to be published in early 2020. This publication will capture historic and contemporary narratives, Indigenous perspectives, land holder experiences, papers on geohydrology, ecology, policy, management and conservation. Adam Kerezszy has submitted two interesting fish papers (fish overview and a paper on the endangered Edgbaston goby, *Chlamydogobius squamigenus*). The Special Issue will be published initially in hard copy, and also available in digital format. Both versions can

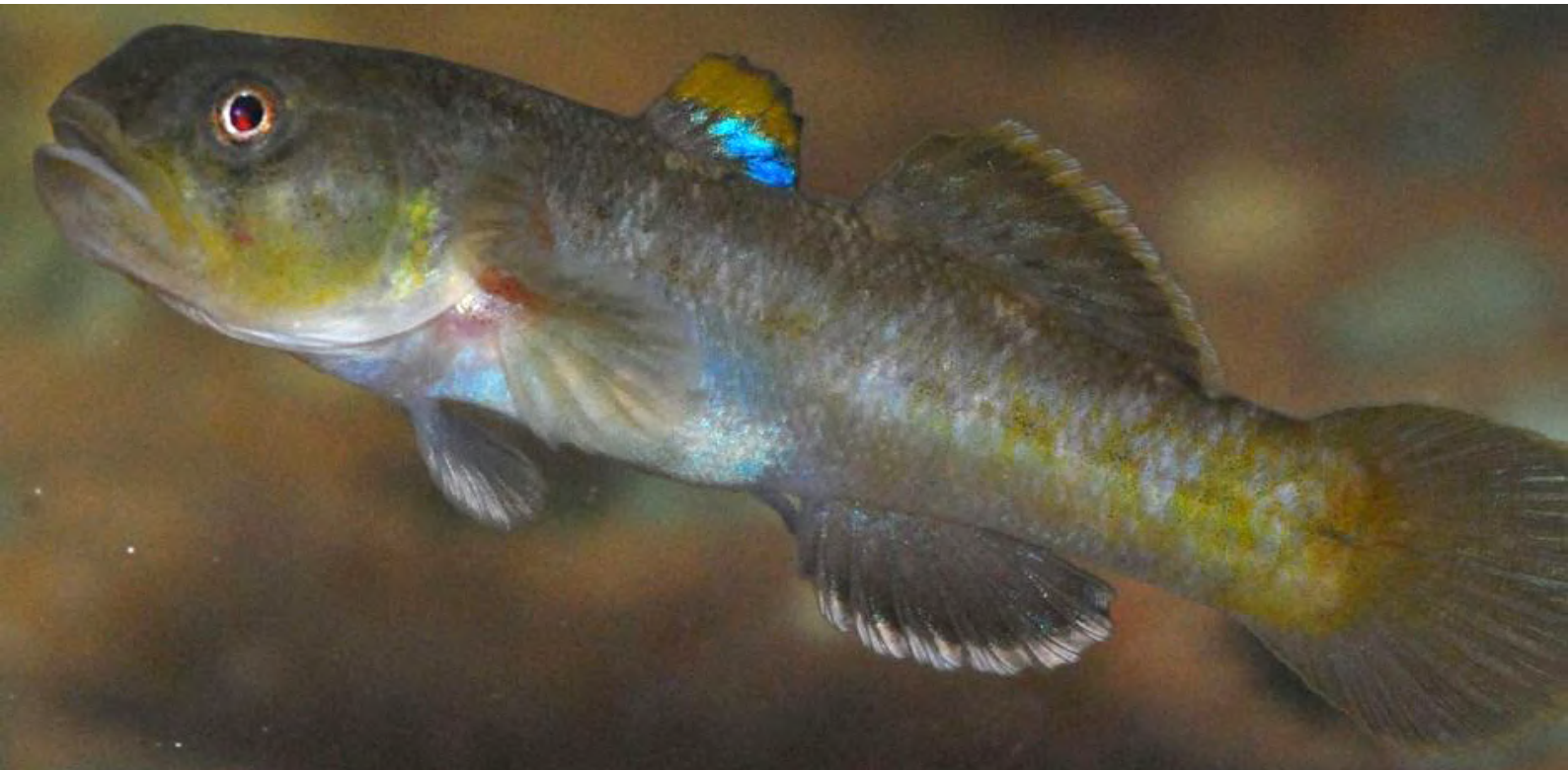
be ordered from the Royal Society of Queensland at admin@royalsocietyqld.org.

A review of the conservation status of Australian freshwater fish species on the IUCN Red List of Threatened Species is due for completion in December 2019. A nomination to list the Cooper Creek Catfish (*Neosilurooides cooperensis*) has been submitted to IUCN. After consideration against strict criteria (e.g. distribution records, ecology, threats), the CCC was provisionally assessed as Endangered. The final nomination, due to be announced in December, will be published by IUCN (Arthington AH, Sternberg D, Cockayne B and Schmarr 2019).

TropWATER, James Cook University

By Brendan Ebner

It has been a pretty quiet year for Brendan Ebner from on the work front. He has managed to get underwater a fair bit and document some interesting behaviours



Above The endangered Edgbaston goby, *Chlamydogobius squamigenus*; photo Adam Kerezszy

regarding grunters playing around with benthic objects while foraging, and reported on the first observed courtship and breeding event of the critically endangered Opal cling goby in the Australian Wet Tropics. He also very much enjoyed meeting other arty types at the Fish science and art workshop and special session at the Canberra conference. A big thanks to Maggie Watson, Lindsay Gutteridge and David Harasti for providing key input and expertise at the workshop. And for those that were at long term member, Mark McGrouther's presentation on creating fish art from drift wood – just Wow! A life of fishes.

Ebner et al. (2019). Juvenile silver grunter *Mesopristes argenteus* shift benthic objects to access food. *Journal of Fish Biology* 95, 974–978.

Ebner et al. (2019). Barred grunters shift objects to access benthic macroinvertebrates in a crater lake. *Food Webs* e00119 (5 pages)

Ebner & Kemp (2019). The boy can dance: Ritual courtship of the Opal cling goby. *Pacific Conservation Biology* (Online early)

Australian Institute of Marine Science, Townsville

By Leanne Currey-Randall

Collaboration between AIMS, the Anindilyakwa Land Council and their Sea Rangers, has given the traditional owners of Groote Eylandt (NT) the tools to better manage and protect their sea country. We presented baseline results on bathymetry, fish communities and participatory mapping at a recent workshop, and trained rangers in monitoring. Baited cameras (BRUVS) recorded >239 fish species in a diversity of habitats, from coral reefs to sponge gardens and open soft-sediment habitats. Working



Top Groote Eylandt field work with Sea Rangers, photo copyright AIMS Nick Thake **Bottom** far northern GBR fish life

together and building capacity has led the rangers to plan future monitoring of their sea country.

Prior to a forecasted bleaching event, baseline surveys on coral and fish communities were undertaken in the Far Northern Great Barrier Reef in January 2019. Complimentary use of BRUVS with underwater transects provided fish data that,

with the benthic surveys, allowed for a better description of the overall condition. Like for southern regions of the GBR, strong environmental gradients across the continental shelf were a strong driver of community structure in the far north, and this data will be used for future planning and monitoring.

Emslie MJ, Cappo M, **Currey-Randall L**, Gonzalez-Rivero M, Johns K, Jonker M, Osborne K, Srinivasan M (2019). Status and trends of reef fish and benthic assemblages of the far northern Great Barrier Reef. Report prepared for the Great Barrier Reef Foundation. Australian Institute of Marine Science, Cape Cleveland, Townsville, Australia.

Birt MJ, Stowar M, **Currey-Randall LM**, McLean DL & Miller KJ (2019). Comparing the effects of different coloured artificial illumination on diurnal fish assemblages in the lower mesophotic zone. *Marine Biology* 166, 154.

OzFish, Townsville

By Geoffrey Collins

OzFish have been continuing to work hard to improve fish habitat in Queensland. From improving oyster reefs in the [south east](#), to working with Landcare groups to restore riparian vegetation in the [tropical north](#), we have been working side-by-side with recreational fishers and landholders to restore and improve habitat values for fish.

We are continuing to extend our project partnerships and identify critical areas of fish habitat in need of restoration in the tropics. A short (but not extensive) list of some key areas of concern include:

- wetlands (freshwater, salt marsh, mangroves, seagrass)
- weed chokes
- invasive species
- poorly designed infrastructure
- barriers to fish passage

- riparian vegetation
- water quality issues (DIN, TSS, pesticides)
- monitoring the longer term benefits to habitat improvement and changes to fish populations

In spite of these and many other issues, there are still some productive fisheries in the tropics which provide a solid foundation for fish populations to increase.

We are always interested in identifying new opportunities and project partnerships. If you have a project idea that works to improve fish habitat we would be happy to hear from you.

SOUTH AUSTRALIA - SA

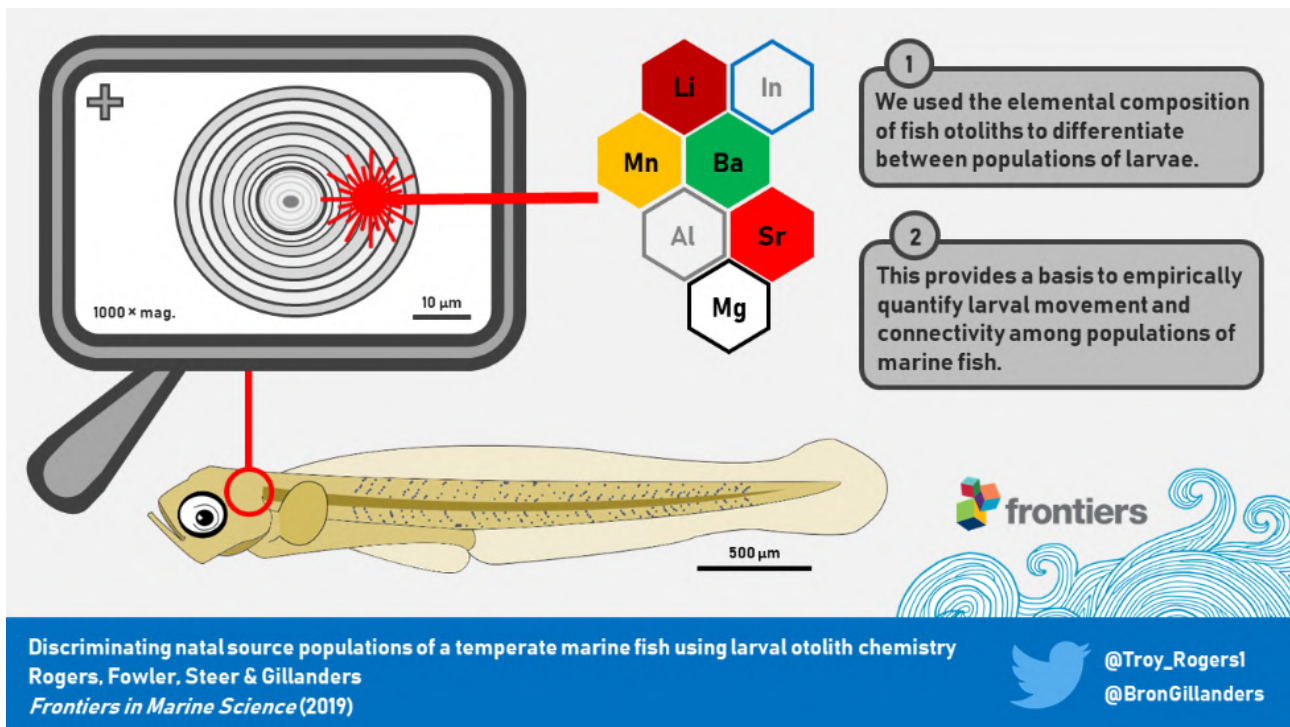
Compiled by Chris Bice and Jasmin Martino

New research out this year by SA ASFB members

Discriminating source populations of marine fish larvae using otolith chemistry

By Troy Rogers, The University of Adelaide, SARDI Aquatic Sciences

The life cycles of many marine species depend on a dispersive larval stage that connects spatially segregated populations. The degree of connectivity among populations during dispersal determines whether a population is essentially self-recruiting, or if it forms part of a larger meta-population where recruits originate from multiple sources. Previous research has struggled to differentiate between these stock structure models for King George whiting (*Sillaginodes punctatus*) in South Australia, largely due to difficulties in identifying the source populations of larvae. In this study, we compared the biological characteristics and otolith chemistry of two spatially discrete groups of recently-



Above Graphical abstract of Rogers et al. 2019

hatched larvae to determine whether they originated from a common spawning population. There were no differences in the sizes (3.0-5.0 mm SL), ages (5-21 d), hatch dates (7-24 April) or average growth rates (0.09-0.21 mm d⁻¹) of larvae. However, multi-elemental (Li, Mg, Mn, Sr, and Ba) otolith signatures differed significantly between the two groups. Because the larvae hatched at the same time, the differences in otolith chemistry provide strong evidence that the two groups of larvae originated from different spawning populations. This study demonstrates the ability of otolith chemistry to discriminate between populations of pelagic larvae in a fully marine environment, which provides a basis to quantify population connectivity of marine fishes.

Rogers T.A., Fowler A.J., Steer M.A. and Gillanders B.M. (2019). Discriminating natal source populations of a temperate marine fish using larval otolith chemistry, *Frontiers in Marine Science*, 6: 711. doi: 10.3389/fmars.2019.00711

SA Fish & Fishery General News Items

Short-headed lamprey on the move in the Murray

By: Chris Bice, SARDI Aquatic Sciences

Over the past decade, SARDI have been monitoring the movement of pouched lamprey (*Geotria australis*) and short-headed lamprey (*Mordacia mordax*) into the Murray-Darling Basin from the Southern Ocean via fishways on the Murray Barrages (supported by MDBA, CEWO, SA DEW). Over this time, we have predominantly captured pouched lamprey, and subsequently used acoustic and PIT (passive integrated transponder) telemetry to monitor upstream migrations of 100's of kilometres in the River Murray. Winter-spring 2019, however, saw us capture 13 short-headed lamprey, and for the first time ever, implant these animals with PIT tags. Subsequent detections of these fish on upstream PIT-reader systems on main channel weir fishways have been limited to one individual, but the data makes for compelling reading. This individual was tagged on the 6th August at Goolwa Barrage, and took a lazy 48 days to reach Lock 1, 274 km upstream of the river mouth. From there, however, it really got moving, being last detected exiting the Lock 10 fishway, at Wentworth 825 km from the river mouth on the 4th of November. This fish covered its last 551 km at a rate of >13 km per day, passing 10 weirs and associated fishways along the way. Whilst data on the movement of one individual is hardly definitive population level information, it does suggest two things. Similar



Left Pouched lamprey (top) and short-headed lamprey (bottom)

to pouched lamprey, contemporary upstream migrations of short-headed lamprey in the Murray-Darling may occur over vast distances (100's of kilometres), while fishways constructed under the Sea to Hume program appear effective in facilitating these migrations. Ultimately, much remains to be known about this species in much of its range in Australia.

Responses of threatened fish populations to environmental management scenarios for Lake Alexandrina determined with Generalized Additive Models

By: Scottie Wedderburn and Deborah Furst, The University of Adelaide, and Thomas Barnes, NSW Fisheries

Two of three threatened fishes occurring in Lake Alexandrina were the focus of the study, namely Southern Pygmy Perch (*Nannoperca australis*) and Murray Hardyhead (*Craterocephalus fluviatilis*). Data is deficient for Yarra Pygmy Perch (*Nannoperca obscura*). The study used data collected from 2008 to 2019 through the Murray-Darling Basin Authority's The Living Murray (TLM) condition monitoring to develop predictive models for each species. The

objective was to develop a statistical model to inform patterns of threatened fish occurrence which can be used by environmental managers when making decisions for the Coorong, Lower Lakes and Murray Mouth icon site, particularly regarding water level management of Lake Alexandrina.

Generalised additive models (GAMs) determined that the drivers, or predictors, of abundance varied somewhat between species. Statistically significant covariates related to the presence and abundance of Southern Pygmy Perch were the abundance of aquatic plants, Lake Alexandrina water level, the abundance of alien fishes, and salinity. There were only two significant covariates related to the presence and abundance of Murray Hardyhead, namely pH and average depth at sampling site. The significant covariate of aquatic plants for Southern Pygmy Perch enabled the development of a spatial model analysis that can suggest the effects of manipulations of lake levels on the availability of habitat and, therefore, the likely occurrence of the fish. It is envisioned that a similar model can be applied to Yarra Pygmy Perch should reintroductions occur in the future. Modelling outcomes for Murray Hardyhead were lacking, possibly due to its rarity, but drivers of its occurrence and

abundance may be identified with additional data collected in future TLM condition monitoring.

The project was funded by the Australian and South Australian Governments as part of the Coorong, Lower Lakes and Murray Mouth Recovery Project and was managed the Department for Environment and Water in South Australia.

Threatened fishes, threatened Country

By: Scotte Wedderburn, The University of Adelaide

The Lower Lakes, Coorong and Murray Mouth at the terminus of the Murray–Darling Basin is an important region for the Ngarrindjeri Nation. Ngarrindjeri have a deep connection with the plants, animals and their land and waters. The population condition of three threatened fishes, namely Murray Hardyhead, Yarra Pygmy Perch and Southern Pygmy Perch, can represent the health of Country.

Ngarrindjeri cultural rangers have conducted fish surveys on Country with ecologists from the University of Adelaide annually since 2011. Surveys involved sampling fish with seine shots and fyke nets to provide an indication of the condition of the threatened fish populations and associated fishes. Surveys during the latter stages of the Millennium Drought revealed the extirpation of all three threatened fishes, which was indicative of the poor health of the lower river system. There has been partial recovery of Murray Hardyhead and Southern Pygmy Perch since the drought broke. Yarra Pygmy Perch has not been recorded since October 2015 and it is likely to be the first freshwater fish extirpated from the Murray–Darling Basin. Importantly, the health of Country is inextricably linked to the health and wellbeing of the Ngarrindjeri People. Engagement between ecologists and the Ngarrindjeri Nation broadens the understanding and value of native wildlife not just for



Top Cultural rangers and ecologists from the University of Adelaide; left to right are Conway Johnson, Tom Barnes, Owen Love and Scotte Wedderburn
Bottom Cultural rangers from the Ngarrindjeri Regional Authority sampling small-bodied fish in Dog Lake

conservation but also so Traditional Owners can argue for improving the health of their Country. The engagement is about generating understanding of the need to repair damage to the river system, which is a shared objective of ecologists and Traditional Owners.

The Murray–Darling Basin Authority has funded condition monitoring of threatened fish populations in the Lower Lakes since 2007 as part of The Living Murray program. The project is managed by South Australia's Department for Environment and Water.



Above *Octopus* under water in South Australia **Right** Zoe Doubleday holding one of the specimens to be studied

Sharks, Rays and Recreational fisheries

By: Paul Rogers, SARDI Aquatic Sciences

SARDI and Monash University are co-running an FRDC-funded National workshop titled, *Sharks and Rays: Priority species, handling guidelines, post-release survival, and extension approaches to support cultural change in recreational fisheries* in Adelaide on 26 November 2019. The workshop will be delivered via a collaboration between two South Australian (2018-055) and Victorian-based projects (2018-042) that address a synergy of state and national scale objectives.

It will summarise: national trends in recreational catch and release fishing, the prioritisation of species for targeted research on post-release survival, and the life history traits that drive sensitivity to capture and handling. The workshop will then support the integration of the available information into agreed, safe handling practices for sharks and rays. The workshop will wrap-up with a session on the current thinking behind communication, science extension and media approaches to achieve and



support positive cultural change in recreational fisheries.

Exploring the abundance, diversity and biology of octopus in remote South Australia to support a new fishery

By: Zoë Doubleday and Jasmin Martino, Future Industries Institute, The University of South Australia

We are working with a Port Lincoln-based business to assess the viability of establishing the state's first developmental octopus fishery. Multiple octopus species are currently harvested at very low levels in South Australia but there is

capacity for the fishery to expand with fishers unable to keep up with market demand. However, there is little information about octopus in South Australia to inform the sustainable development of the industry.

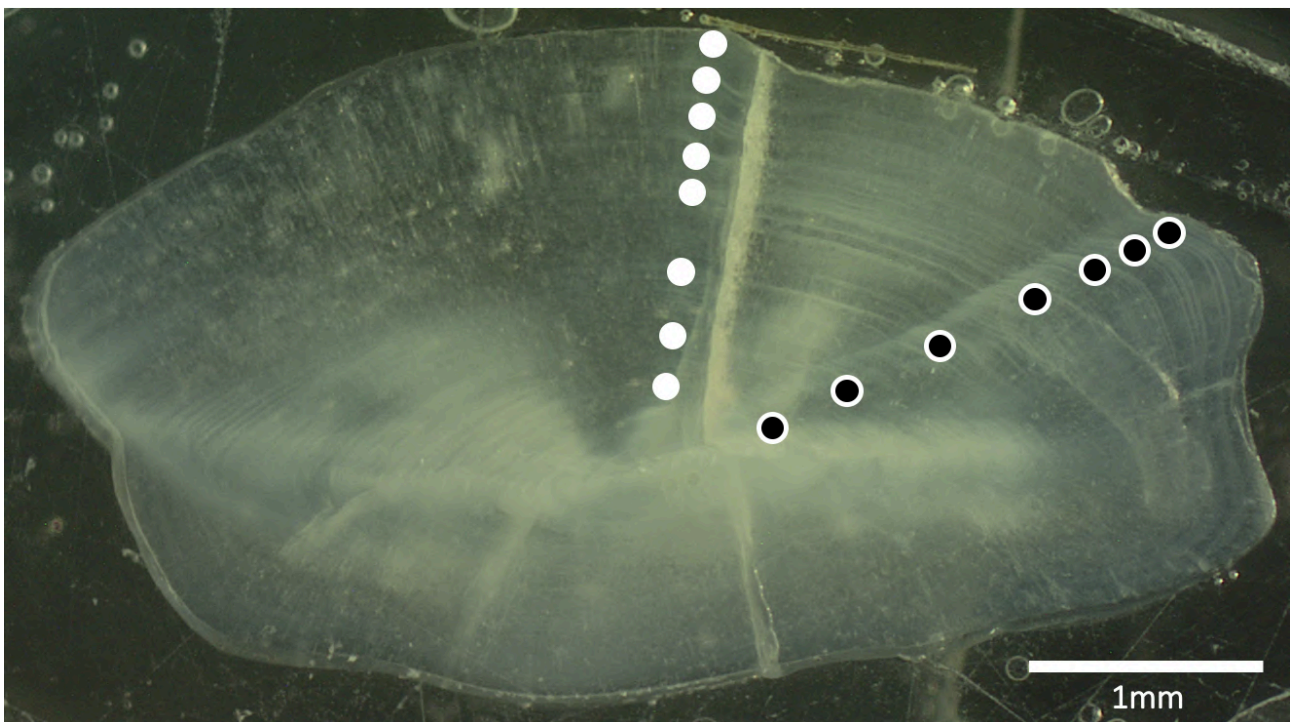
Our priority is to identify what octopus species exist in the region and assess their biological characteristics (including sex ratios, morphometrics, age, maturity and reproductive potential), as well as collect tissue samples for future genetic and chemical analyses. We are also assessing catch rates (abundance) in both fishing zones and no-take marine protected areas to determine the effect of fishing (or conversely the effect of MPAs) on octopus stocks.

We have currently collected around 200 octopus, which are being analysed at the University of South Australia's Future Industries Institute, where we are establishing a new marine research group. Watch this space, *inkredible* things are coming!

Determining population structure and connectivity through otolith chemistry of stout whiting

By: Koster Sarakinis, Honours student, The University of Adelaide (Supervisor: Bronwyn Gillanders)

Stout whiting (*Sillago robusta*) is an important recreational and commercially fished species endemic to Australia. My study looked at the population structure and potential connectivity of the east Australian stock, to understand the movement and habitat use of these populations through the analysis of fish ear stones (otoliths). Results from both otolith aging as well as geochemical analyses suggested the presence of limited inshore nursery habitats located along the coast of southern Queensland and New South Wales, with sampled populations showing chemical heterogeneity between each location. Running transects from otolith core to edge of a subsample of adults showed that individuals were moving and developing independently, promoting population connectivity along the east coast. The presence of a potential stout whiting meta-population spanning the east-Australian coast would require these limited source populations to be appropriately managed and conserved. The project was done in conjunction with Dr Matt Taylor and Daniel Johnson from NSW Department of Primary Industries. Additional support was provided by



Above Stereo microscope image of a 7-year-old stout whiting (Sillago robusta) otolith section

Jason McGilvray from the Department of Agriculture and Fisheries, Queensland.

Southern Seas Ecology Laboratory – The University of Adelaide

The Gillanders laboratory has continued its research addressing ecological issues in Australian waters and abroad. As seen by talks given at this year's ASFB conference, the lab has been hard at work analysing microplastics in a range of marine animals, along with fish otoliths using microchemistry and have several students working on ecology of freshwater fishes (Sandra Leigh, Chris Bice).

We have had three PhD students graduate (Matthew McMillan, Jasmin Martino, Kayla Gilmore) this year with two more submitting over the last few months (Brenton Zampatti, Troy Rogers). In addition, six Honours students working on fish or elasmobranchs have completed this year including two in the middle of the year (Molly Altschwager, Tegan Lee). We also welcome back postdoctoral researcher Patrick Reis Santos to the lab. New PhD students include Qiaz Hua working on population structure and proteomics of octopus, and Solomon Ogunola investigating microplastics in crustaceans.

Plastics in our marine ecosystem

The group currently has funding from the Fisheries Research Development

Corporation and is collaborating with SafeFish SA to investigate microplastics in Australian fish and invertebrates. PhD student Nina Wootton is currently working on determining whether fish species from both Australian and Fijian waters contain microplastics. Determining the abundance and composition of microplastics in selected species has been completed through dissecting and dissolving the gastrointestinal tracts, followed by sieving and microscopic imaging. In addition to this, the project also incorporates crustaceans (undertaken by PhD student, Solomon Ogunola), bivalves (Koster Sarakinis) and cephalopods to understand the extent to which plastic pollution has found its way into our marine ecosystems.



Above Joe Widdrington filleting a southern bluefin tuna (*Thunnus maccoyii*), photo Jack Wilson

Joe Widdrington has recently completed his honours research which looked at microplastics in four species of pelagic fish including recreationally-caught southern bluefin tuna. Findings allowed for an initial record of microplastic prevalence in pelagic species, with plastic found in 52% of all samples analysed.

Vinuri Silva has looked at the presence of microplastics in much smaller, filter feeding species such as anchovies and sardines. Vinuri's Honours project has incorporated tropical species collected from both Australia and Sri Lanka, two countries with varying waste management strategies. Results found that over 90% of samples analysed from Sri Lanka contained microplastics, whereas less than 55% of the same species in Australia contained microplastics.

The analysis of chemical tracers of plastic present in our marine life was investigated by honours student Sophie Dolling, who looked into both fish liver and muscle tissue to compare the efficiency of extraction methods prior to gas chromatography mass spectrometry. Findings have suggested that Accelerated Solvent Extraction (ASE) coupled with a Florisil clean up treatment for removal of lipids and proteins provided the best recovery of compounds.

Fish otolith chemistry to determine population structure and connectivity

Troy Rogers has recently completed his PhD, investigating connectivity between spawning grounds and nursery areas of King George whiting in South Australia's gulfs using both otolith chemistry and biophysical modelling. The study determined that the relationships between different spawning grounds and nursery areas change significantly throughout the protracted spawning season, which has updated the understanding of stock structure and has implications for fishery management. Troy has published three manuscripts from his PhD this year.

In more international research, Honours student William Goh has completed his work on juvenile pink snapper (*Chrysophrys auratus*) sampled from New Zealand's North Island. His

study looked at determining population structure and potential heterogeneity across the northern coastline. Findings indicated significant differences in chemical signatures between juvenile populations with groupings of locations that could potentially be used for future research and conservation efforts. This research was undertaken in collaboration with Mark Morrison from NIWA in New Zealand.

Also, in collaboration with NIWA we have been analysing jackass morwong or terakihi from New Zealand this year, using otolith



Above *Dissecting fish guts at Tunks Park Boat Ramp, New South Wales, photo Solomon Ogunola*

microchemistry of adult samples providing some insight into how these population differ across both the North and South Island. Other otolith chemistry research includes research on mulloway along the New South Wales Coast (PhD research of Angela Russell).

TASMANIA - TAS

Compiled by Jonah Yick

Gear Type	October	November	December	January	February	March	Total
Non-Targeted Gillnets	2	6	17	4	1	0	30
Inshore Set Gillnets*	0	0	1	0	0	0	1
Barrier Fyke Nets	2	0	2	0	0	0	4
Backpack Electro-fisher	0	0	0	0	0	0	0
Boat Electro-fisher	0	0	0	0	0	0	0
Gillnets Behind Barrier Nets	0	0	3	1	0	0	4
Total	4	6	23	5	1	0	39

Table 1. Total carp captured from all methods used in Lake Sorell over the 2018/19 season, *blocking gillnets which prevent access to particular bays

Inland Fisheries Service: Carp Management Program

By: *Jonah Yick*

The 2018/19 financial year resulted in 39 carp caught, which brings the total number of carp removed from Lake Sorell to 41 491 since their discovery in 1995. Locating and catching carp is now becoming increasingly difficult. As many as fifty-five gill nets averaging 90 to 250m in length were set each day during the peak spawning period from October 2018 to February 2019. Despite drastically increasing the fishing pressure over the last few seasons, the total carp catch and catch per unit effort (CPUE) has continued to decline (Figure 1), with the amount of carp caught over the 2018/19 season less than half of the total number caught over the previous season (Figure 2). The majority of carp were caught in gillnets set close to the margins of the lake. Trammel gillnets were the main type of gill net used due to their high catch efficiency. A range of other fishing techniques were still used to ensure all sizes of carp were vulnerable to capture (Table 1).

The biggest carp last season was caught in late December in a trammel gill net. This individual was a female that weighed 1857gm, and had a gonad weight

of 364gm (GSI: 20%). This was the only large carp caught all season, with the average sized carp weighing 797gm. Quite extraordinary given that this cohort of fish are now ten years old! The overall small size and poor condition of fish caught is an indication that we are now down to the remnants of the carp population, which have previously been less catchable due to having a much lesser drive to spawn. Not only are the majority of carp in poor reproductive condition, but the presence of the jelly gonad condition (JGC) in male carp is at a ratio of 1:1 in relation to healthy males (Figure 3). Although the affected fish do not exhibit any apparent external

Below One of the four carp which pushed into a barrier fyke net last season, in response to warming water temperatures and rising lake levels.



deformities, the gonads begin to develop watery blisters, and in the advanced stage of the condition, the fish become reproductively unviable. This increasing presence of the JGC in male carp will play an important positive role in the final stages of eradication.

Monthly sampling for spawning in Lake Sorell started in December, culminating with a large survey in March which involved a total effort of 278 backpack electrofishing minutes, 7779 fyke net hours, and the use of fine mesh dip nets. This resulted in numerous eels and golden galaxiids caught, but no sign of any young of the year carp.

After 25 years the Tasmanian carp battle is finally drawing close. It is estimated that there are now less than 20 wild fish remaining from the 2009 population, and when you take into account the stunted average size, poor general condition, and approximately 50 percent of the males affected with JGC, the odds are not in their favour.

eDNA: A new tool to establish invasive species eradication success

Tasmanian Inland Fisheries Service

A group of researchers from the University of Canberra in collaboration with the Tasmanian Inland Fisheries Service have examined how environmental DNA (eDNA) surveys can be used as a cost-effective method to detect invasive species present at low densities.

Published recently in the *Journal for Applied Ecology*, the research looked at the invasive European carp, *Cyprinus carpio*, in two Tasmanian lakes that have been undergoing a carp eradication program since 1995. Lead researcher Dr Elise Furlan from the University of Canberra examined two lakes in Tasmania: Lake Crescent in which carp had been eradicated and Lake Sorell in which carp are currently being eradicated. eDNA surveys involve the collection and analyses of an

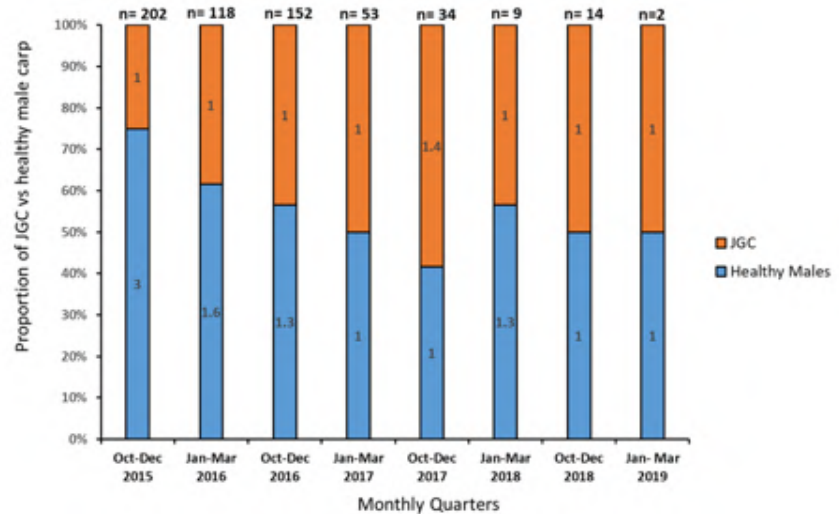
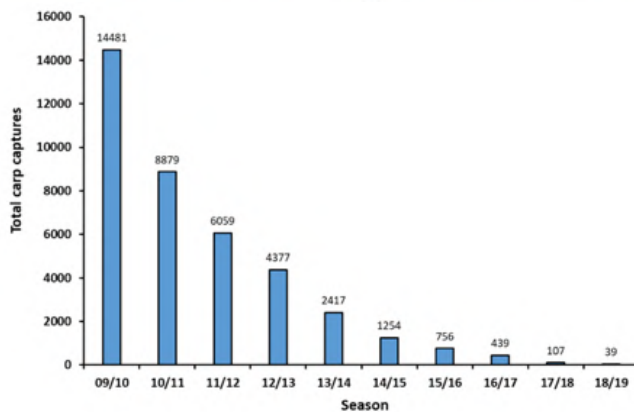
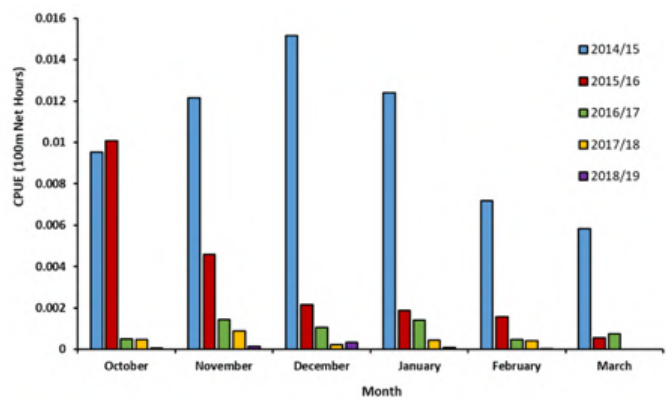


Figure 1 Catch per unit effort (CPUE) of non-targeted gill netting during the carp fishing season (October to March) in Lake Sorell comparing the 2014/15, 2015/16, 2016/17, 2017/18, and 2018/19 seasons

Figure 2 Total carp captures from Lake Sorell (2009-2019) **Figure 3** The change in ratio of jelly gonad condition (JGC) males to healthy males from 2015-19, compared by October to December and January to March quarters

environmental sample, like a water sample, to infer a species presence from trace amounts of DNA they shed into their environment. eDNA surveys can provide a cost-effective way to detect species at low densities and importantly the sensitivity of eDNA surveys can be

Left Dr. Elise Furlan examining water samples collected from historical carp habitat in Lake Crescent



quantified. Therefore, it can be a valuable tool to determine if an invasive species, especially an aquatic species, is present or not.

Knowing when to stop an eradication program, like those in Tasmania for European carp, is challenging. “If it’s too early the invasive species will likely increase in numbers again, but if it is prolonged it incurs unnecessary costs. eDNA surveys are able to assist in determining if the invasive species is still present, which helps those running the programs to make informed choices about whether to continue or stop a program”- Dr Furlan said.

The paper ‘eDNA surveys to detect species at very low densities: A case study of European carp eradication in Tasmania, Australia’ can be found following this [link](#).

Jelly gonad condition affected carp in Lake Sorell

*By Raihan Mahmud,
Institute for Marine and
Antarctic Studies*

Raihan Mahmud has been investigating the Jelly Gonad Condition (JGC) of Lake Sorell carp for the last four years. This project was supervised by A/P John Purser and Dr. Jawahar Patil from the Institute for Marine and Antarctic Studies (IMAS). The primary objectives of the project were to characterise the condition, detect any potential biological and abiotic cues that

Below Raihan Mahmud with a JGC male carp caught in a trammel net



influences the condition and assess the practical application of the condition. The results of the research indicated that occurrence of this condition is unique, but shares some feature with human carcinoma. Over 7000 genes and more than 130 pathways were distinguished to be involved with the JGC condition, however, 40 genes were found to be the prime suspects developing the condition. Follow up research is underway to potentially discern the function of those prime genes. Overall, this research could be helpful to understand the many aspects of biology including sterility, cell death and reproduction. This PhD project is complete and a thesis detailing the research findings, background literatures, practical applications and future directions of the JGC project has been submitted to the University of Tasmania.

Native Freshwater Fish Conservation – Arthurs and Woods lakes

By Rob Freeman, Inland Fisheries Service

Each year the Inland Fisheries Service (IFS) conducts monitoring surveys for several threatened native species of freshwater fish throughout Tasmania. At Arthurs and Woods lakes, this has occurred annually for over twenty years, where we have kept a watch on the two species of galaxiids; the Arthurs paragalaxias (*Paragalaxias mesotes*) and the saddled galaxias (*Galaxias tanycephalus*) that only occur within these two waters.

At Woods Lake, the Arthurs paragalaxias was absent for over twenty years (1993 – 2013). However, we translocated over 2,500 individuals from Arthurs Lake to Woods Lake between 2009 and 2013 in an attempt to re-establish a viable population. During October 2014, eleven were found at Woods Lake and there was evidence they were breeding successfully. Follow up surveys including the latest results (October 2019), have shown mixed results, but have confirmed that the Arthurs paragalaxias remain established in Woods Lake in low numbers.

The Arthurs paragalaxias population within Arthurs Lake is increasing at a steady rate, with 161 individuals captured during the latest monitoring survey (Figure 1). This indicates this species is doing well in this water, with strong recruitment of juvenile fish from the 2018 spawning period.

The saddled galaxias has been found in reasonable numbers over many years in Woods Lake. However, the last three monitoring surveys have shown that the numbers of this species have declined to low levels (Figure 2). The reasons for this are likely to be a combination of significantly improved water clarity and several high recruitment years for brown trout. At present, the lake holds a significant number of brown trout in the 2-4 year old age classes and with clear water present, allows trout to prey on the saddled galaxias more effectively.

At Arthurs Lake, saddled galaxias numbers are usually moderately low. However, over the last two years, monitoring suggests their numbers

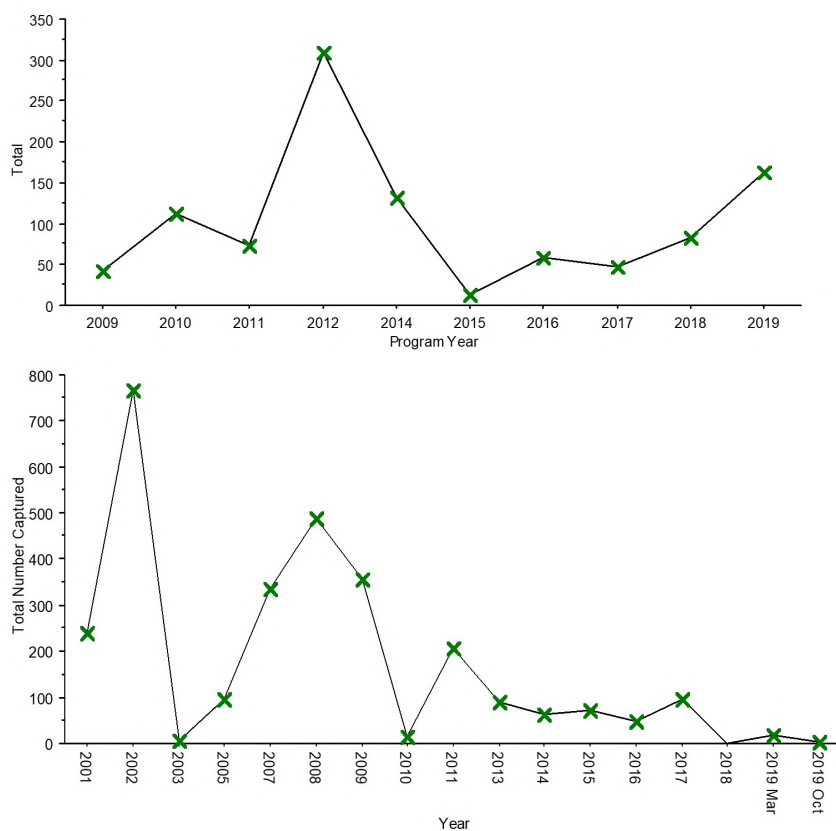


Figure 1 Catches of the Arthurs paragalaxias from Arthurs Lake 2009 – 2019 **Figure 2** Total catch of saddled galaxias from Woods Lake 2001 - 2019



Above One of only eight saddled galaxias caught during the recent monitoring survey in Arthurs Lake in October 2019

have declined to even lower levels, with only 8 individuals captured during the most recent survey in October 2019. The cause for the decline is unknown at present; however it is unlikely to be due to trout predation. Recovery options for the management of saddled galaxias in both Woods and Arthurs Lake are currently being considered.

Spotlight on Southern Bluefin Tuna at documentary launch

By Sean Tracey, Institute for Marine and Antarctic Studies

The Australian recreational fishing community gathered with others in the fisheries sector in Melbourne recently for the world premiere of Al McGlashan's highly-anticipated Southern Bluefin Tuna (SBT) documentary, *Life on the Line*.

The documentary was launched by the Assistant Minister for Forestry and Fisheries, Senator Jonathan Duniam, at an outstanding sold-out event organised by Associate Professor Sean Tracey and his Institute for Marine and Antarctic Studies (IMAS) [Tuna Champions](#) team.



Left Documentary screening *Life on the Line*; photo Chris Grech



Above Evening host Brownlow Medallist and Tuna Champion Ambassador Patrick Dangerfield (centre), pictured here with (from left) Fishing identity and Tuna Champion Ambassador Paul Worsteling, ARFF Chair Brett Cleary, AFMA Executive Manager Fisheries Management Branch Anna Willock, Tuna Champion Ambassador and filmmaker Al McGlashan, Assistant Minister for Forestry and Fisheries Senator Jonathan Duniham, and IMAS Associate Professor

Life on the Line is the story of how government, industry, research and the fishing community worked together, here in Australia and internationally, to put SBT on a pathway to recovery.

Humanity has a long history of exploiting the ocean's generous harvest, and we assume the ocean will always provide. But the world's ever-increasing population is putting growing pressure on our ocean resources.

Without proper management, this means uncertainty for some species, and the endangered list for others. High on that list is the Southern Bluefin Tuna. In the past, the demand for its prized meat drove this iconic species to the brink of extinction.

We could simply have banned SBT fishing in Australia, but this migratory species is fished throughout the southern hemisphere. If Australia had stepped away and didn't participate in the SBT fishery, things could have been much worse.

Guests (**below**) had the unique opportunity to see a Traditional Japanese Tuna Cutting Demonstration (**right**), focusing on respecting and using every part of the fish, with **Narito Ishii-san** in collaboration with **Oceania Seafoods**. This was followed by SBT sashimi tastings created by **Kisume Restaurant**



Instead, along with Japan and New Zealand, we became founding members of the Commission for the [Conservation of Southern Bluefin Tuna \(CCSBT\)](#), an international organisation which manages SBT as a single breeding stock. Other CCSBT member countries include the European Union, Taiwan, Indonesia, the Republic of Korea and South Africa.

Australia continues to play an important role in turning the tide for this perfect pelagic predator, which has recently moved from depleted to recovering, in the [Status of Australian Fish Stock \(SAFS\)](#) reports.

Tuna Champions is an initiative of the Australian Recreational Fishing Foundation in collaboration with the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania, funded by the Australian Government through the Fisheries Research and Development Corporation.

Genetic research undertaken for the critically endangered Red Handfish

By Sharon Appleyard, CSIRO

Our Red Handfish [IMAS/CSIRO](#) PhD student, Tyson Bessell, is incorporating a genetic component into his research. Under the direction of expert geneticists, [Dr Sharon Appleyard](#) (CSIRO, Hobart) and [Dr Carolyn Hogg](#) (University of Sydney), he will be looking at several key areas, including:

- Characterising gene regions in Red Handfish
- Assessing whether we can use non-harmful methods for collecting DNA (e.g. loose skin 'tags')
- Looking at whether we can collect genetic material from water samples ('eDNA' sampling), since all animals (including us) leave traces of DNA in their environment (via mucus, reproduction, dead skin, waste products, breathing etc.).

And if it's successful, not only will it present an effective/reliable method for looking for new populations of red handfish... but it'll also be incredibly useful for similar work with other cryptic/rare species.

More about DNA

Every living organism has the same four nucleotides ('building blocks')—A, C, G, and T — that make up its' DNA sequence (and therefore encodes the genetic information specific to individuals and species). It's just the order and how many building blocks that differ.

We first need to "screen the handfish DNA" for the most appropriate gene or DNA fragment. This just means figuring out the specific order that the nucleotides occur in specific regions of the DNA in Red Handfish. Sounds easy enough... But for comparison, the human genome contains over 3.5 billion of these genetic letters...

How do we sequence genes in Red Handfish?!

- (1) Collect known handfish tissue samples (e.g. from deceased Red handfish that have been found in the field, and seeing if we can also use loose skin tags)
- (2) Create multiple copies of the DNA using a genetic procedure called PCR (Polymerase Chain Reaction; or 'molecular photocopying')
- (3) Separate and analyse the DNA
 - using a method called DNA sequencing, we determine the length and order of the nucleotides in the DNA sequence or gene of interest
 - this includes sequencing other closely related fish (and handfish e.g. Spotted handfish) to determine how similar or dis-similar the DNA in Red Handfish is to other species
 - we then take the sequences from the genes or DNA fragments that we are interested in, and compare them to sequences in international repositories of DNA sequences (such as the BarCode of Life Database – '[BOLD](#)')

More about eDNA

Environmental DNA (eDNA) is a complex mixture of DNA (from many organisms) that is found in a sample (e.g. water). Once we know the sequence of a gene region in a species – we can hopefully search for it using eDNA techniques (i.e. analysing water samples to look for handfish DNA).

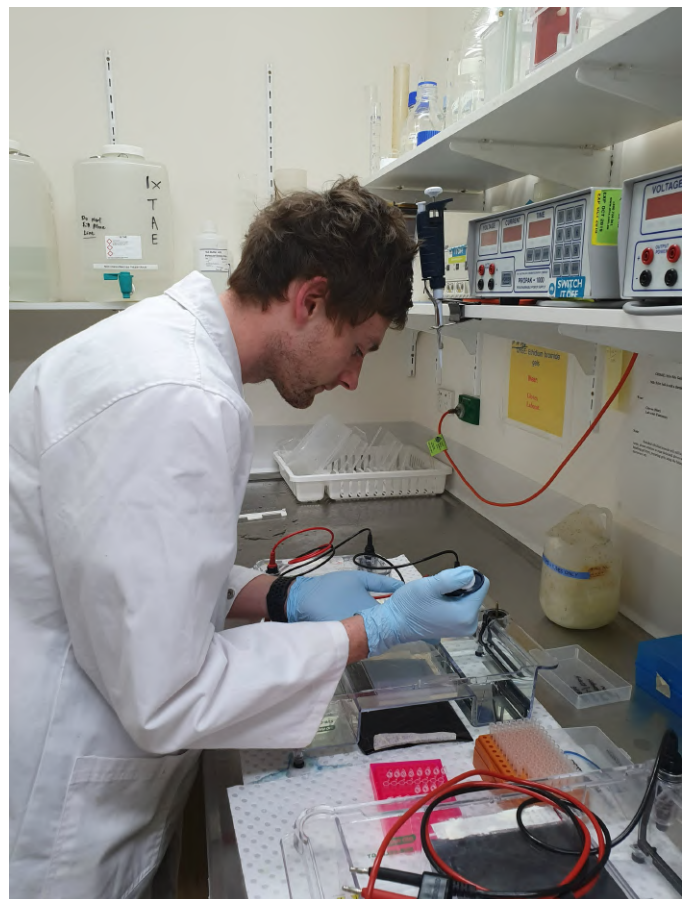
Why it would be useful for handfish:

- sampling can be undertaken by non-scientists, so we could involve the community in searching for new populations



- sampling is non-destructive
- it's an emerging tool for biological surveys of organisms that are not required to be captured or when animals are difficult to observe in the environment (e.g. tracking rare & threatened species; monitoring invasive or threatening species)
- we could help refine search areas before sending in dive teams to confirm

Above *Red Handfish*; photo *Rick Stuart-Smith*
Right *Tyson* processing red handfish DNA samples at the *CSIRO Hobart labs*



Tyson has spent a great deal of time learning genetic methods in both the [University of Sydney](#) and [CSIRO](#) (Hobart) labs.

More information on the Handfish Conservation Project [here](#)

Golden galaxias populations sky rocket in lakes Crescent and Sorell

By Jonah Yick, Inland Fisheries Service

The endangered golden galaxias (*Galaxias auratus*) is a native Tasmanian fish which is only

found in lakes Crescent and Sorell and associated waterways. The fish lay their eggs along rocky shorelines from winter to early spring, and the extensive wetlands found around the margins of both lakes are likely to be important nursery areas for juveniles. Their

relatively short life span of approximately 30 months, in conjunction with low lake levels and subsequent lack of breeding habitat, can result in poor recruitment events, and vulnerability to population crashes. As a result, the Inland Fisheries Service in collaboration with the Water Management Branch at the Department of Primary Industries, Parks, Water and Environment, undertakes annual monitoring of golden galaxias, as per the Lakes Sorell and Crescent Water Management Plan 2005.

In March this year, the survey was undertaken for the 14th consecutive year. At lakes Sorell and Crescent, twelve fine-mesh fyke nets were set overnight at three locations within each lake. Sets consisted of four fyke nets at each location, with the number of golden galaxias captured per fyke net recorded. In addition, the fork lengths of 100 golden galaxias were recorded for each lake. The total catch of golden galaxias in Lake Crescent was 6,679, with all sites producing good numbers of fish. At Lake Sorell 5,882 golden galaxias were captured, with the Grassy Point site capturing three quarters of the total catch. This site also produced over half the total catch at Lake Sorell during the 2018 survey and remains a highly productive area for galaxiids. The long term declining trend in CPUE for Lake Crescent has stopped, with a major increase in the number of galaxiids captured during the 2019 survey (Figure 1). This increase is almost entirely due to the large number of juvenile fish from the 2018 spawning. A similar magnitude of change was also recorded at Lake Sorell with the CPUE increasing by 400% between the 2018 and 2019 surveys (Figure 1). This result reflects the response of high recruitment during inundation of rocky and marshland areas that provided good spawning conditions and favourable

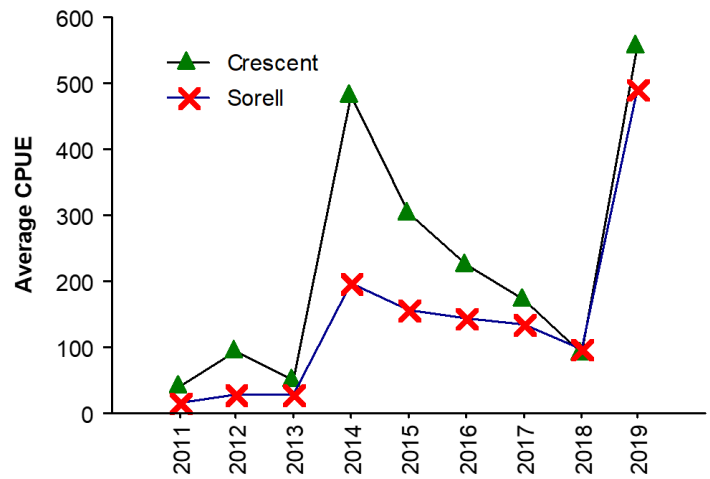


Figure 1. Average (mean) CPUE of golden galaxias for lakes Crescent and Sorell, 2011-2019.

juvenile habitat.

There were very high numbers of young of the year golden galaxias captured in both lakes, with a strong cohort of juvenile fish in the 45 – 75 mm length range for Lake Crescent, and 30 –



Above A wide range of size classes of golden galaxias were caught during the 2019 Lake Sorell and Crescent surveys **Right** A huge golden galaxias measuring 21.5cm, caught in October after the survey while undertaking carp management activities in Lake Sorell



70 mm for Lake Sorell. In comparison to the 2018 survey, there appears to be lower survival of longer (older) fish into the 3+ year class at both lakes.

Based on these results, the golden galaxias populations within lakes Crescent and Sorell remain healthy and resilient. The provision of favourable lake level management during the critical spawning and juvenile development stages is necessary if this resilience is to persist.

Assessing the status of Australia's fish stocks relative to target objectives

By Nick Hill, Institute for Marine and Antarctic Studies

Nicholas Hill, an Institute for Marine and Antarctic Studies PhD student recently published his first chapter in Marine Policy assessing the status of Australia's fish stocks relative to commonly set target policy objectives (<https://doi.org/10.1016/j.marpol.2019.103741>). Communicating the performance of commercial fish stocks is a fundamental role of fisheries management. However, this is often undertaken by reporting stock status relative to limit reference points (LRP). Reporting against LRP is effective in drawing attention to stocks that are overfished but does not identify fisheries where performance could be improved by shifting stocks closer to target reference points (TRP), that is, benefit can be foregone despite stocks being fished sustainably. This study examined the performance of Australian fish stocks against a TRP of 40–60% of unfished biomass, the level at which economic performance is generally optimised. Of 123 stocks evaluated, 41 (33%) were at target biomass levels, 28% were above and 39% below. This result, in combination with the major output of the 2016 Status of Australian Fish Stocks report, shows that although most Australian stocks are not overfished, many are outside levels that would deliver greatest benefits. While maintaining all stocks at target levels may be impractical given the dynamic nature of fisheries, failing to maximise the number of stocks at target levels reflects lost ecological, economic and social

potential. Assessing stocks relative to TRP in addition to LRP would highlight opportunities for improving fisheries while still addressing the

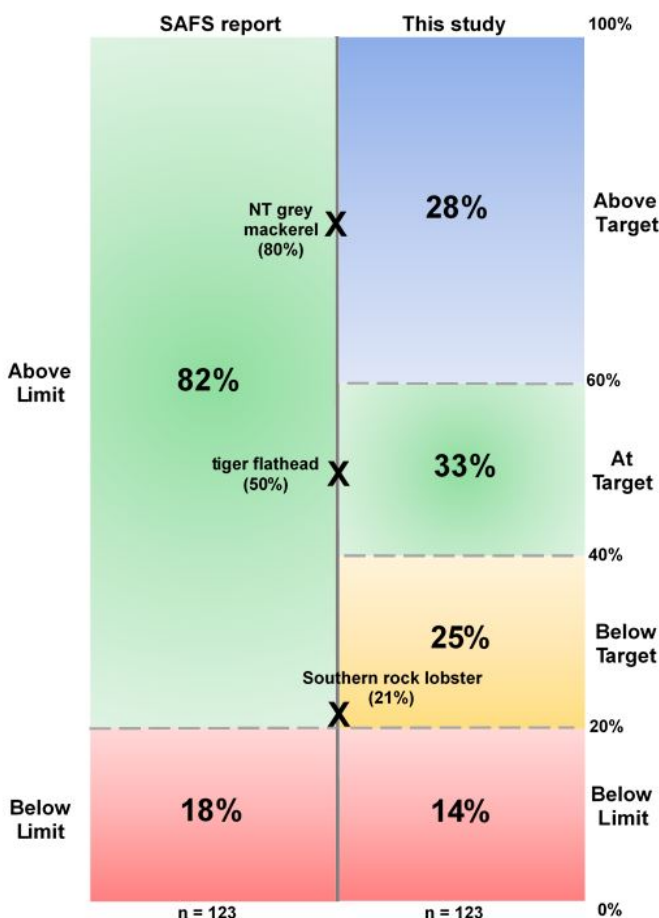


Figure 1. The status of stocks when assessed relative to biomass related target objectives compared against the outcomes of the 2016 SAFS report. The biomass estimates for three example stocks are indicated by the black crosses and are elaborated on in the Discussion

fundamental requirement of preventing stock depletion.

WESTERN AUSTRALIA - WA

Compiled by Alissa Tate

Australian Institute of Marine Science (AIMS)

By Katherine Cure

The AIMS west side branch has seen a busy year for fish ecologists in an array of projects. Our monitoring programs with Indigenous rangers have continued to grow, with both Bardi-Jawi (Kimberley-WA) and Anindilyakwa (Groote Island-NT) now collecting their second year's data on fish communities and associated habitats. On the industry side of things, we're in the process of finalising research looking at the potential effects of seismic surveys on fish fauna (movement patterns of *Lutjanus sebae* and overall fish assemblage structure before and after seismic impact), and have started deep water surveys of gas pipelines to better understand their associated fish assemblages.

Recently, we have also completed a series of surveys looking at deep water fish populations at the Key Ecological Feature (Australia's ancient coastline), which lies at about 120 m of depth; although habitats were largely dominated by sand and mud, we found some exciting big sharks and what the crew in our research vessel the RV Solander called "fish porn" at some sites. Mathew Birt has two new papers, the exciting "[Chasing Tail](#)" showing evidence of pre-copulatory behaviour in zebra sharks, and an evaluation of [light choice](#) for deep water BRUVS showing that regular white light is by far the best!

Department of Biodiversity, Conservation and Attractions

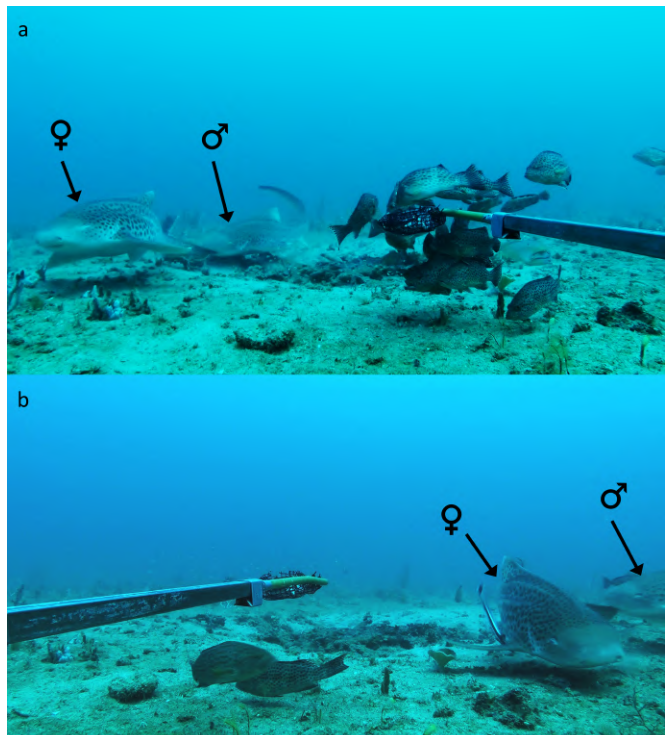
Compiled by Shaun Wilson

Finfish research

The Marine Science Program (MSP) within the Department of Biodiversity, Conservation and Attractions (DBCA), undertakes research and monitoring across WA's



Top RV Solander crew ready for BRUVS deployment **Middle** Groote Eylandt Traditional Owners looking at the outcome of research in their Sea Country **Right** Zebra sharks *Stegostoma fasciatum* showing evidence of pre-copulatory behaviour





Left Montebello Islands fish diversity
Bottom Stereo-DOVs as a survey technique



network of marine reserves, providing scientific information for their management. Due to their ecological, economic and social importance, finfish are recognised as ecological values in management plans for most of the state's marine reserves and are typically key performance indicators of management effectiveness. Accordingly, fish are a focal area of both research and monitoring by MSP.

A major area of research by MSP has revolved around the identification of fish habitats and understanding how change to habitat influences the abundance and diversity of fish assemblages. This has become increasingly important as our work with colleagues at AIMS and CSIRO has described extensive coral loss on many of the state's reefs (Gilmour et al 2019), whilst mapping by MSP research scientists Simone Strydom and Kathy Murray has documented a 1,300 km² decline in seagrass across the Shark Bay World Heritage Area following the 2011 heatwave. This is the largest loss of seagrass recorded globally and emphasises the profound effect that climate change is having on the marine environment. Clearly these changes will

have consequences for associated fish and the ecosystem services they provide.

To investigate effects of habitat loss on fishes MSP principal research scientist, Shaun Wilson, has been working with colleagues at Lancaster University in the UK, tracking changes in coral reef fishes following coral bleaching and mortality in the Seychelles. This research suggests that branching corals are keystone structures on reefs and the loss of these corals is associated with reduced abundance of small bodied fish from all feeding groups

(Wilson et al 2019). Lower numbers of small fish can compromise key processes, such as herbivory, with related work demonstrating that rates of grazing are greatest when herbivorous assemblages are dominated by small bodied fish (Robinson et al. 2019a). Moreover, the structure of fish assemblages is unlikely to return to the same composition, even after 15 years of coral recovery (Robinson et al. 2019b), signalling changes to ecological processes provided by fish. Changes to fish assemblages may also influence the catch composition of local fisheries, which become increasingly reliant on species that inhabit macroalgal dominated reefs (Robinson et al 2019c). For this reason, MSP scientists have been working with colleagues at Australian National University, AIMS and universities from around the globe to improve our understanding of macroalgal fish ecology and the functional role of macroalgal fields in tropical seascapes (Fulton et al. 2019).

Monitoring fish

The DBCA marine monitoring program is a collaborative venture between MSP staff, locally-based marine park managers, other

government agencies, and external research institutions. The program uses a combination of underwater visual census (UVC) and stereo methods; diver operated video (DOV) and baited remote underwater video (BRUVs) to assess the condition of fish communities relative to environmental and human pressures. Over the past year the team has undertaken fish surveys at Montebello and Barrow Islands Marine Reserves (DOV) and Ningaloo Marine Park (DOV and BRUVs). Surveys at both locations were co-ordinated by Dr Jordan Goetze, who joined the marine science team in March 2019 and will be responsible for monitoring and research of finfish in the states network of marine reserves. Dr Goetze has previously worked on global projects assessing the condition of finfish and sharks using both DOVs and BRUVs and recently published a standard operating procedure for DOV (Goetze et al 2019) and short video to explain the benefits of this method (<https://methodsblog.com/2019/06/13/stereo-dov/>).

Using a combination of survey techniques often makes it difficult to detect long-term trends in

fish abundance with respect to spatial zoning in marine reserves. However, a recent study led by PhD student Anna Cresswell, and co-authored by MSP scientists, used meta-analysis to overcome some of these problems and compare fish data from Ningaloo Marine Park that was collected using three different methods over the past 30 years (Cresswell et al. 2019). Encouragingly the results indicate that abundance and biomass of lethrinids targeted by recreational fishers has been consistently greater within sanctuary zones. This effect was most apparent in larger sanctuary zones and known habitats of lethrinids. The status of finfish in Shark Bay Marine Park is also now available (Holmes et al. 2019 <https://library.dbca.wa.gov.au/static/FullTextFiles/072335.pdf>). This is the second of a series of monitoring reports that will document the condition and pressures of ecological assets identified in management plans for the state's marine reserves.



Below Snapper school during a DBCA monitoring survey

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Department of Primary Industries and Regional Development

Fisheries Resource Assessment and Management

Compiled by Alissa Tate

The work undertaken by DPIRD's scientist and managers to look after the Western Australian fisheries resources has continued, despite the ongoing restructure of the agency since the amalgamation of the former Departments of Fisheries, Agriculture & Food, and Regional Development. The restructure of the Aquatic Science and Resource Assessment branch has seen a merging of the group focused on ecosystem impacts of fishing with the stock assessment and survey teams, and a shuffling of the previous finfish and invertebrate groups into the new nearshore and offshore groups to align with DPIRD's resource-based approach. Changes have also occurred within the Aquatic Resource Management branch, which has the difficult job of making decisions about the management of the State's fisheries based on available scientific information. Many are now looking forward to a well-deserved Christmas break to re-charge their batteries for 2020!

Ecosystems & Assessments

The work undertaken by Emily Fisher and others to support the assessment of WA fisheries against the Marine Stewardship Council (MSC)

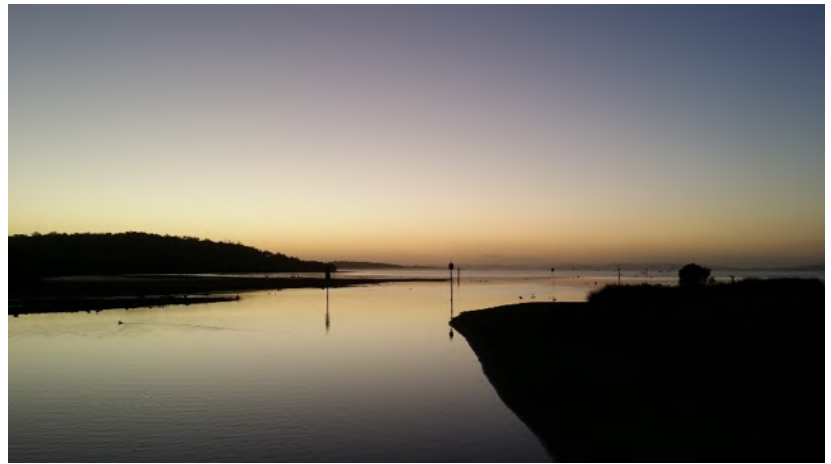
standard for sustainability continues. The number of MSC certified fisheries in WA will soon reach double digits, with two more fisheries (octopus and sea cucumber) now at the end of the assessment process. A number of projects are also progressing to address conditions on already certified fisheries, including updated stock assessments and harvest strategies for several species, the review of migratory shorebird data and habitat information for the Peel-Harvey Estuary, and the completion of Ecological Risk Assessments for the Exmouth Gulf and Shark Bay prawn fisheries.

Members of the Marine Ecological Monitoring section have been busy exploring other aspects of ecosystem-impacts of fishing. Alastair Harry has recently completed another field season in the Kimberley, where he continued to collect baseline data on nearshore teleost and elasmobranch communities throughout the state marine parks in this region. These data are being used to develop a long-term fisheries research and monitoring program for WA's network of marine parks in the Kimberley. Mathew Hourston and Daniela Waltrick are progressing an FRDC project that uses remote cameras on three Australian sea lion colonies in WA to monitor these populations to help better understand fishery interactions. Scott Evans has been busy finalising an FRDC report on seagrass habitats in Exmouth Gulf, which also forms part of his PhD with scientists at the University of Western Australia.



Above Ecological monitoring in the Kimberley; photos Alistair Harry

Rachel Marks is currently working on her part-time PhD project investigating different factors influencing the population dynamics of the blue swimmer crab (*Portunus armatus*) in southwest WA. Her first paper has recently been accepted for publication, which analyses relationships between temperature, density, primary productivity and growth of this species in Cockburn Sound. Future work includes biomass dynamics modelling which aims to provide understanding of how the production and abundance of this species in Cockburn Sound may respond to fishing and environmental factors.



Left Yellowfin whiting are an increasingly popular target for saltwater fly fishers in the estuaries of WA's lower west coast
Above Dawn over the Wilson Inlet on WA's south coast; photo Tim Leary

Finfish

Following the departure of Brett Molony late last year, the job of guiding the team through the last 12 months has been shared between Gary Jackson and Steve Newman. Keeping staff wellbeing front-and-centre while meeting research commitments as the process of WA public sector reform entered its final stages, and the downsizing/re-structuring of DPIRD 'fisheries' research groups at Hillarys became our reality, has been challenging. Everyone is looking forward to the summer break.

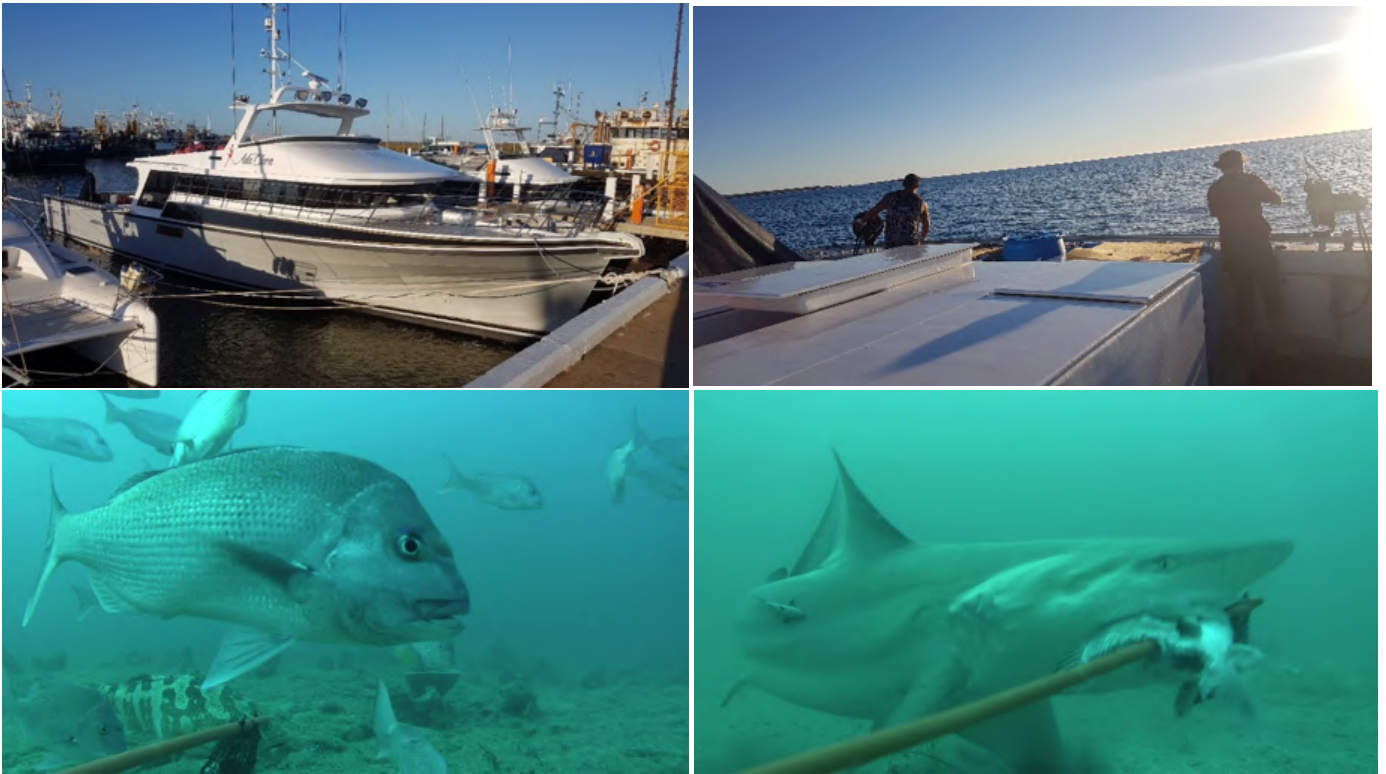
Kim Smith and the Nearshore/Estuarine team (Amber Quinn, Blaine Hodgson and Tim Leary) have continued their monitoring and assessment work for a large range of species with the focus this year on sea mullet (*Mugil cephalus*) to meet final year audit MSC requirements for the Peel Harvey Net Fishery. Yellowfin whiting (*Sillago schomburgkii*) are another species of commercial interest in this system and of increasing interest to recreational lure and saltwater fly fishers. Kim has detailed the gradual poleward shift in this species in WA since the 1950s that is related to ocean warming and that has been accelerated by the 2010/11 marine heatwave (<https://www.frontiersin.org/articles/10.3389/fmars.2019.00407/full>)

Chris Dowling has been off on secondment to the Shark Monitoring Network team where he has been responsible for diving operations to maintain the 300+ Vemco receivers that are currently in the water off the WA lower coast,

mostly located off the Margaret River region as part of the Smart Drumline Trial <https://www.sharksmart.com.au/research/>. Rod Duffy and Tim Leary spent much of the year working up cobble (*Cnidoglanis macrocephalus*) samples from multi-panel gillnetting trips in Wilson Inlet that aimed to replicate previous work carried out by Murdoch University researchers, and working towards another cobble stock assessment, the results of which were recently presented to commercial fishers in Albany.

Off Shark Bay, monitoring snapper (*Chrysophrys auratus*) in the closed area north of Bernier Island continued this year with Nick Jarvis assisted by Brett Crisafulli, Blaine Hodgson and Nick Breheny fishing on board commercial vessel the 'Ada Clara'. Fishing using standard dropline gears combined with deployment of BRUVs at well-known snapper spawning grounds is collecting information that will be incorporated into the next stock assessment and provide the basis for future fishery-independent surveys.

When not dealing with additional demands in relation to the latest West Coast Demersal Scalefish advice, Dave Fairclough and Danielle Johnston have been providing scientific input on fish and inverts in Cockburn Sound (snapper and blue swimmer crabs in particular) at various workshops run by the Westport Taskforce (<https://www.transport.wa.gov.au/projects/westport.asp>). This State Government body is tasked with developing a plan to manage WA's



Top left Research vessel of choice FV 'Ada Clara', **Top right** Fishing for snapper off Koks, **Bottom left** BRUV images of snapper at 35 m depth and **Bottom right** other members of the Shark Bay ecosystem; photo: Nick Jarvis

growing freight demands for the next 50 years and beyond and is currently focused on selection of site for Perth-WA's next generation container port. Dave is also working with Gary Jackson on the FRDC project 'Where did the snapper go? Determining factors influencing the recovery of snapper stocks on the west coast of Australia' that commenced mid-year and is also the WA lead on the Flinders University ARC project 'Fisheries genomics of snapper in Australia and New Zealand Waters'.

Jeff Norriss and team were again at sea in March-April monitoring interactions between the South Coast Purse Seine Fishery and flesh-footed shearwaters in the waters of King George Sound off Albany. Jeff also recently presented at the Purse Seine Annual Management Meeting where low sardine catches were a hot topic. Wearing one of his other hats, he has been coordinating the collection of frames of snapper, Bight redfish (*Centroberyx gerrardi*) and hapuku (*Polyprion oxygeneios*) from off the south coast for an age based assessment to be completed in 2020 - a few thousand otolith reads coming up!

Paul Lewis has recently completed a Fisheries Research Report on the SW artificial reef trial project, to be released when North Metropolitan Artificial Reef off Ocean Reef is announced in February 2020. This report shows development of reef community over 5 years, differences between Bunbury and Dunsborough areas and hence reefs, limited impacts on communities in surrounding area and meeting overall goal of providing recreational fishing opportunities. Paul is also responsible for monitoring and assessment of large pelagics that included the Spanish mackerel (*Scomberomorus commerson*) age-based stock assessment that is due to be completed next year with biological sample collection currently being undertaken by commercial fishers.

Matias Braccini, Sharks, spent the first half of the year on long service leave working at the FAO headquarters, Rome, on CITES-shark related projects. He was also 'out of the office' in October, teaching a postgrad course October on the use of R for the analysis of fisheries and



Top Rarely seen juvenile Bight redfish, photo: Jeff Norriss **Bottom** mullet on Bunbury Reef, photo: Paul Lewis

ecological data at the National University of Mexico. Back at home, Matias is leading a Parks Australia-funded project looking at comparing the catch composition, and interactions with TEPS and habitat for demersal gillnet and longline fishing gears off the WA south coast. He is also participating in a national stock assessment of scalloped hammerheads and in between, updating and expanding stock assessments for WA commercial shark species.

Research on shark depredation in WA continues. Karina Ryan and colleagues published a study using phone survey of licensed fishers to quantify levels of interaction with sharks and how this varies with location and fishing gear being used <https://www.sciencedirect.com/science/article/pii/S0308597X19300831?via%3Dihub>. And Harrison Carmody successfully completed his Masters research that looked at 13-year dataset of commercial daily logbook data for the WA Mackerel Managed Fishery, to quantify how fishing effort and environmental variables influence shark depredation. A paper is currently in review.



Above Matias tagging sharks off the RV Naturaliste, photo: Matias Braccini

Invertebrate trawl

Inigo Koefoed has continued to progress his part-time PhD project; investigating the biology of the endeavour prawns (*Metapenaeus endeavouri*) in Exmouth Gulf and undertaking stock assessments on the penaeid prawn fisheries of WA. Work is well underway on a paper that describes how logbook data can be used to identify localised depletions, and thus estimate the catchability coefficient (q) – a parameter very useful to know when conducting stock assessments. The paper goes on to investigate the influence of temperature on the catchability of the commercial penaeid prawn species of WA, as well as comparing catchability estimates from WA's two major prawn fisheries; Shark Bay and Exmouth Gulf.

comprehensive 12-month long survey (2017/18) combining on-site survey data (boat-ramp and remote camera survey data) with off-site phone surveys, over 40,000 recreational fishers have now participated in this survey since 2011. The team is gearing up for another season sampling Western Rock Lobsters caught by boat-based recreational fishers in Western Australia. With recent changes to the management of Western Rock Lobster, Scientist Claire Smallwood is leading a project using concurrent phone and online recall surveys to capture data on fishing effort and total catch from licenced Rock Lobster fishers. While Scientists Alissa Tate and Cameron Desfosses continue to conduct their annual access point survey to collect biological information from



Above Stock assessments underway in Exmouth Gulf, photos Inigo Koefoed

Future work for his PhD includes using logbook-based depletions to estimate stock biomass, with a comparison to biomass estimates calculated within stock assessment models. He also plans to soon publish results on the reproductive biology of endeavour prawns in WA

Surveys of recreational fishing

The Surveys Team has had another busy year in the field interviewing boat and shore-based recreational fishers across Western Australia. Senior Scientist Karina Ryan is currently wrapping up the fourth statewide survey of recreational fishing. This survey is a

boat-based fishers in the Perth metropolitan region.

Scientist Steve Taylor wrapped up his 12-month survey aimed at estimating boat-based recreational catches and fishing effort in Inner Shark Bay. This survey will assist in assessing how recent management changes may have influenced recreational catch levels in addition to paving the way forward for future cost-effective monitoring of recreational fishing in this remote region. Scientists Alissa Tate and Claire Smallwood have continued their work focusing on shore-based recreational fishers in the fishers Perth Metropolitan. The project now



Top Amiee Brown and Shannon McNamara and **Above** Kade Parmenter collecting biological information from boat-based recreational WRL fishers in the Perth metropolitan region

in its seventh year collects biological and catch and effort data that complements the state-wide boat-based fishing survey data and assists in the management of key nearshore species. Scientist Cameron Desfosses completed his survey on scoop-net fishers in Peel-Harvey Estuary to assess the spatial footprint of Blue Swimmer Crab “scoopers”. This study combined a roving survey and remote camera data to provide fine-scale spatio-temporal data on fishing effort to satisfy an MSC condition: the development of a risk assessment to assess the risk of irreversible harm to the habitat. Drones were also trialled to determine the amount of fishing activity occurring in out-of-scope areas that are inaccessible to survey staff.

Fisheries Management

Patrick Cavalli and the trawl management and science teams engaged Prof. Malcolm Haddon to conduct a review of the Shark Bay prawn and scallop trawl fisheries in April 2019. Findings of the review are being incorporated in new harvest strategies for the Shark Bay crab, prawn and scallop resources. The trawl team is also developing new harvest strategies for the Exmouth Gulf prawn and Abrolhos Islands scallop trawl fisheries. Completion of these harvest strategies in the coming months will ensure WA’s major trawl fisheries are managed under formal harvest strategies.

As part of his role in the finfish management team, Shane Walters has been working with a stakeholder-based harvest strategy reference group to develop a formal Recovery Plan for oceanic Pink Snapper in the Gascoyne bioregion. The draft Recovery Plan, which was released for public consultation during November 2019, sets out a clear recovery ‘roadmap’ with clear targets to ensure pink snapper can recover within acceptable timeframes.



Top Shannon Burchert interviewing a herring fisher at Fremantle South Mole **Bottom** David Oberstein recording a Pink snapper caught from the shore

Rhiannon Jones and others continue to work with Surf Life Saving Western Australia and Recfishwest to ensure a safe and enjoyable recreational abalone season in 2019/20. The metropolitan fishery has a 4-hour open season, with the opening of the four Saturday mornings over summer now closely linked to weather and swell forecasts to ensure conditions for fishing are safe.

Murdoch University

ASFB members from Murdoch have had a busy year- with the University in a major restructure, the old Centre for Fish and Fisheries Research has been dissolved and reorganised into the Centre for Sustainable Aquatic Ecosystems (CSAE). CSAE, directed by Alan Lymbery, is one of the five research centres within the newly minted Harry Butler Institute, named after the famed West Australian environmentalist and educator. Many current and former ASFB members play active roles within this Centre- watch this space!

Freshwater Fish Group and Fish Health Unit (Catchments to Coast Research Node), Centre for Sustainable Aquatic Ecosystems, Harry Butler Institute

Stephen Beatty

Pre-restoration aquatic surveys have been completed in the Harvey River drainage system funded by the Alcoa Foundation and Greening Australia (managed by the Harvey River Restoration Trust within the Peel Harvey Catchments Council). The survey revealed that the highly modified habitats are still suitable for recruitment of several native freshwater fishes, but that they are unable to over-summer likely owing to extreme temperatures and impacts of alien fishes. This suggests that restoration of the drains has a strong likelihood of enhancing the native populations by affording greater protection from extreme heat and alien species. The project was led by Stephen Beatty and David Morgan.

A range of ongoing projects have commenced on the threatened Carter's Freshwater Mussel in south-western Australia associated with drainage infrastructure upgrades for the City of Busselton and Water Corporation. Led by Stephen Beatty, Alan Lymbery and Alan Cottingham, this has included relocating and monitoring this ecologically important species to mitigate the impacts on the species.

River Health monitoring to assess the viability and responses of native fishes and crayfishes to ecological water provisions has occurred in the Canning, Brunswick and Collie Rivers for the Department of Water and Environmental Regulation. The monitoring has confirmed that populations of all fishes and crayfishes are being maintained under existing release regimes.

David Morgan and team have been busy working on a range of projects in the Kimberley and Pilbara inland and nearshore regions, this has included responding to fish kills and continuing the work of Team Sawfish. Drop him a line for details d.morgan@murdoch.edu.au

PhD candidate Anthony Santoro (supervised by Jane Chambers, Stephen Beatty and Brendan Ebner) is conducting a study that is quantifying the spatial ecology of the South-west Snake-necked Turtle in wetlands on the Swan Coastal Plain and how ongoing hydrological change may impact the species in the long-term.. Using radio-tracking and GPS loggers, Anthony is also revealing high rates of mortality associated with nesting due to road trauma and impacts of native and introduced terrestrial predators.

Facebook: Freshwater Fish Group and Fish Health Unit

Twitter: @FishFisheries , @FreshFishMurd

Aquatic animal health

Alan Lymbery

Congratulations to Erin Kelly, who was recently awarded her PhD for her study of

the health of wild populations of catfish in northern Australia. Erin published six papers from her thesis and is currently working on a seventh. Two other PhD students, Siew Mee Bong and Nuwandi Pathirana, are also studying the health of native freshwater fishes; their focus is on how bacterial infections affect fish physiology and behaviour, and particularly how host/parasite interactions and infection dynamics may be influenced by climate change.

Freshwater mussel research continues to be a focus, with work on environmental management plans for the threatened south-west endemic *Westralunio carteri*, and a new grant from the Australia and Pacific Science Foundation to investigate the potential of farm dams to provide refuge habitat for the species. Like all freshwater mussels, *W. carteri* is parasitic on fish in the first stage of its life cycle, so ensuring that artificial refuges have an appropriate host fish community is an essential element of the study.

Research in the aquaculture field is also continuing apace. Joining our existing PhD students (Luke Pilmer and Nipa Gupta), who are working on bacterial diseases in cultured yellowtail kingfish, is a new student from China, Cai Xin. Cai will be studying the immune response of turbot to infection with *Vibrio anguillarum* in a joint project between Murdoch and Qingdao Agricultural University.

Aquatic Megafauna group

Adrian Gleiss

The aquatic megafauna group has had some excellent news over the past year, with Courtney Ellen receiving first-class Honours for her thesis investigating unsupervised machine learning techniques for the analysis of accelerometer data. Well done Court! Also, massive congratulations to Karissa Lear for submitting her PhD thesis on the ecological energetics of sharks and rays. Karissa's thesis made some important discoveries about the mechanisms underlying flow-ecology relationships of freshwater sawfish in the Fitzroy River, something that will be of utmost importance

in the management of this system. Karissa has published a number of papers out of her PhD already, in prestigious journals, such as *Journal of Experimental Biology*, *Scientific Reports* and *Oecologia*. Karissa is now undertaking post-doc work with Dave Morgan on green sawfish in the Pilbara.

Evan Byrnes and Oliver Jewell have spent the year in a last flurry of data-collection before it is time to write up all that great data on shark movement and energetics. Evan alone has 36 flights under his belt this year alone... hope you are collecting airmiles buddy! He has just returned from a productive trip to Mozambique tagging bull sharks and Giant Trevally with Ryan Daly (Durban Aquarium). Evan has also finished a stint doing respirometry on large lemon sharks in the Bahamas that was a few years in the making (phew!). Oli is about to return from his field-season in California, where he worked with Salvador Jorgensen of the Monterey Bay Aquarium and Taylor Chapple of Oregon State University where they tagged a whopping 19 sharks with camera-multi-sensor tags. Oli also had the first chapter of his PhD published in *Biology Letters*, showing extensive use of kelp forests by white sharks in South Africa. Well done team!

2020 is looking to be a busy year for the group which will welcome a new PhD student with Marie Windstein, who has been awarded a Murdoch University International Scholarship. Marie will join us from the Galapagos Islands. Marie will work on the ecology of nearshore elasmobranchs in the Kimberley in collaboration with Mike Travers and Al Harry from DPRD. 2020 will also see Adrian Gleiss wrapping up a Seaworld Research and Rescue grant to investigate the eco-hydrology of the Fitzroy River in relation to sawfish habitat, in collaboration with Dave Morgan and Matt Hipsey (UWA).

WA Museum

Fish Section

Glenn Moore & Mark Allen

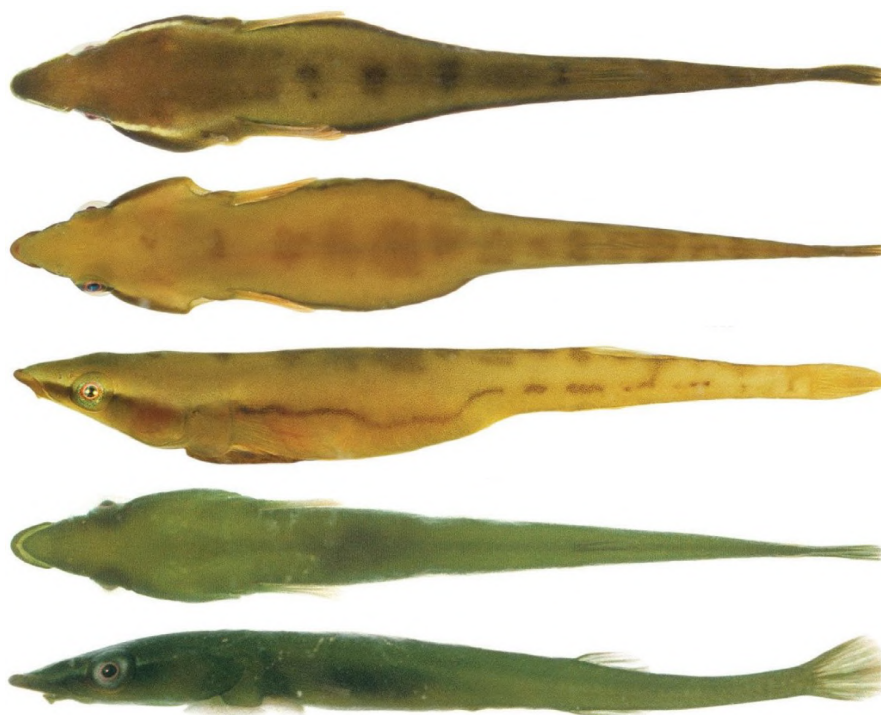
The exciting New Museum building is due to open in late 2020. This once-in-a-generation opportunity for WA is now close to commencing gallery fit-out. The priority for all science staff in the museum has been to deliver the scientific content, writing and development of the exhibitions, photography and sourcing suitable images and/or specimens. As always, the unique work of a Museum continues. Ongoing maintenance of the State's collection is a significant legislated responsibility and one that takes considerable time and resources. Accessioning, collection maintenance and databasing are never-ending parts of a Museum's work, which is, of course, a publicly available resource. With the ongoing closure of the Museum's main public interface at the Northbridge site, the Museum is working very hard to maintain the Museum's other major role - public outreach. As such, the Fish section is always very busy with presentations, media and exhibitions as well as identifications for members of the public.

The New Museum priority has slowed down research projects, but there have been some opportunities for science. In February, Glenn Moore joined a team, headed by Mark Lintermans, in Melbourne to assess the country's freshwater fishes under the IUCN Redlist process. The new assessments are due for publication soon. In June, a huge team of both marine and terrestrial taxonomist and systematists from the WA Museum, WA Herbarium and others undertook a huge survey of Cape Range and Exmouth Gulf as part of the Commonwealth Bush Blitz program. This is a nature discovery program to document the plants and animals across Australia with species discovery as one of its goals. We sampled reefs and mangroves that have had almost no (if any) previous biological sampling.

Glenn (with Zoe Richards, Curtin University) secured a small grant to visit the community at Kalumburu. We spent several days camping on Wunambal Gaambera Country with Elders, Unguu Rangers and school students. It was a wonderful

opportunity to share some of the findings of our Woodside Collection Project, educate and inspire local students, Rangers and emerging Elders, share and link stories of WAM science and traditional knowledge and promote open dialogue and long-term relationships built on trust and respect.

Amongst research highlights for the year was the description of two new clingfishes from temperate Australia. These species were first recognised by Barry Hutchins decades ago and have been waiting for name. We were delighted to be able to honour Barry by naming the genus after him and one of the species too (see photos). We also hosted two visitors (Michael Hammer, MAGNT; Hisashi Imamura, Japan) with whom we have collaborative projects to advance the taxonomy of the state's fishes.



Above *Barryichthys* – new clingfish species named after Barry Hutchins, photos Glen Moore

2019 Recreational Fishing Workshop- Western Australia

By: Cameron Desfosses

After a 9-year hiatus, a group of up to 70 researchers, managers and stakeholders gathered at the Marine and Freshwater Research Laboratories at Hillarys from the 28th of October to the 1st of November to participate in the 2019 International Recreational Fishing Workshop. Experts gathered from across Australia, New Zealand and the United Kingdom to exchange information on current and future policies and recreational fishing research for each

jurisdiction. This included approaches for monitoring participation, effort, catch, fisher behaviour and socio-economics, how these data provide evidence for assessment and management approaches, and how they compare with current best practice.

Dr Kieran Hyder from the Centre for Environment, Fisheries and Aquaculture Sciences (CEFAS) in the United Kingdom and Dr Bruce Hartill from the National Institute of Water & Atmospheric Research Ltd (NIWA) in New Zealand provided insightful overviews of the monitoring and assessment of recreational fishing in the U.K./ Europe and New Zealand respectively. Dr Aldo Steffe from Fishing Survey Solutions and Dr John Henstridge from Data Analysis Australia provided perceptive keynote presentations on the importance of survey design for complex surveys and the challenges for obtaining representative survey samples in the digital age, respectively.

From the Western Australian representatives, the DPIRD team (Nathan Harrison, Brent Wise, Karina Ryan, Steve Taylor, Eva Lai, Claire Smallwood, Alissa Tate, Cameron Desfosses, Lachlan Strain and Stuart Blight) presented on various aspects of the statewide survey as well as other innovative on- and off-site surveys that have been implemented in

Below Participants of the 2019 International Recreational Fishing Workshop in Western Australia



recent years to provide data to further support assessment and management, including Marine Stewardship Certification (more details in the “State Report”). There were also presentations by post-graduate students (Eva Lai, Brett Crisafulli, Ebenezer Afrifa-Yamoah, Shannon Burchert, Matthew Navarro) from Edith Cowan University and the University of Western Australia who are contributing to increasing our understanding of recreational fishing in Western Australia.

From the interstate representatives, Kane Dysart and Shane Penny (N.T.), James Webley and Daniella Teixeira (Qld), Faith Doyle, Julian Hughes and Ashley Fowler (N.S.W.), Simon Conron and Justin Bell (Vic), Jeremy Lyle, Sean Tracey and Emily Ogier (Tas), Mike Steer (S.A.), and Andy Moore (Commonwealth) shared current research and future directions for their respective jurisdictions.

There were also several presentations from non-fisheries organisations (Eugene Siow and Sebastian Mission [Social Research Centre – ANU], Vicki Graham [Survey Research Centre – ECU], Paul McLeod [Economic Research Associates]) on the work they undertake to support recreational fishing surveys and assess some of the less tangible (e.g. socio-economic) aspects of recreational fishing.

All representatives contributed to vigorous and wide-ranging discussions on research and management matters that are common to each jurisdiction, including: evaluation of survey designs and statistical methods; improving the accuracy, precision and representativeness of survey estimates; and how to incorporate survey outputs in reporting and assessments. These invaluable collaborations will pave the way for future efficient and effective recreational fishing surveys in Western Australia, across Australia and internationally.

The first recreational fishing workshop at Hillarys in 2010 was integral in the development of a state-of-the-art survey to estimate boat-based recreational catch and effort across Western Australia. In the



Top Statewide biological survey
Middle Roe’s abalone (*Haliotis roei*) fishers
Right Peel Harvey recreational fisheries surveys, Western Australia

subsequent years, four integrated state-wide surveys have been completed that have assisted in ensuring that current management

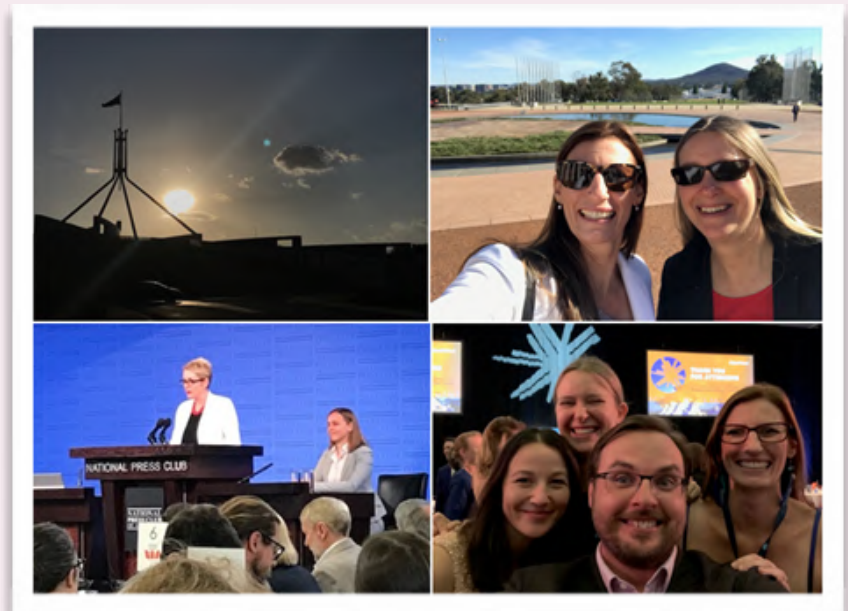
settings are effective in managing recreational fishing. This recent workshop has allowed both DPIRD and interstate researchers and managers to remain up-to-date with current best practices within Australia and world-wide to keep future recreational fishing surveys as accurate and relevant as possible. A report from this second workshop will assist in planning for the next decade of surveys to be implemented in Western Australia.

Finally, special acknowledgement must go to Rachel Marks for her exceptional logistical talents in organising and running the workshop, predominantly on one leg. With help from Karen Williams, Vangie Gerginis, Sue Martin, Shannon Burchert and Dave Oberstein the week went without a hitch. It was an outstanding success!



Above *Using drones to survey recreational effort in the scoop-net survey at Peel Harvey estuary, WA*

Science & Technology Australia (STA) Science Meets Parliament 2019 wrap



Above ASFB representatives at SmP in Canberra 2019

Alison King and Lenore Litherland recently represented ASFB at STA's 20th Science meets Parliament event in Canberra. Joining them were two other ASFB members, Zoe Doubleday and Chris Fulton (in other capacities with STA), providing a fantastic representation for the field of fish and fisheries.

Over 200 scientists from a diverse range of science, technology, engineering and maths (STEM) disciplines engaged with more than 70 MP's and Senators for a day packed full of discussions about how science and technology can build a progressive and resilient future for Australia. The group clocked up more than 37 contact hours talking science with decision makers 'on the hill' (and yes some of the face-to face meetings did include an opportunity to chat climate).

Not only was it great professional development networking with scientist across diverse fields, it felt productive chatting with politicians and advisors about the use of science in decision making. It was encouraging to see representatives from across the political spectrum meeting with scientists to learn more about science and technology in Australia.

In addition to meeting with MPs we participated in training sessions on communicating science and networking as well as discussion panels on STEM education, STEM leadership, gender balance, unconscious bias, pitching and science integrity. It was inspiring to hear from Australia's Chief Scientist Dr. Alan Finkel on speaking for science and to attend the National Press Club Address by Australia's Women in STEM Ambassador Prof. Lisa Harvey-Smith. We also squeezed in a side meeting with fellow representatives from 10 scientific societies, organised by STA's Ecosystem Sciences hub.

Some take home messages include:

- Speak out, speak up- communicate your science through stories and show why your research matters
- As scientists within the community we all have a key role to play in enthusing the younger generation to engage in STEM
- Develop networks and help our decision makers understand how to access science to provide solutions

More details on the speakers and program can be found here <https://sta.eventsair.com/science-meets-parliament-2019/>

Student Spotlights

Charlotte Birkmanis– PhD Candidate

**The UWA Oceans Institute | School of Biological Sciences,
The University of Western Australia**

'Spatio-temporal distribution of Indo-Pacific marine predators'

Supervisors: Dr Ana Sequeira (UWA), A/Prof Julian Partridge (UWA), Prof Leigh Simmons (UWA)

Research interests

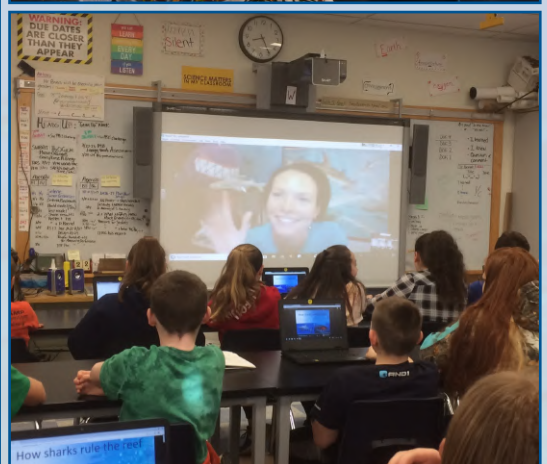
I am a marine ecologist who is actively engaged in researching and communicating predators and ecosystem conservation. My research interests are predator behaviour and ecology, the ecological impacts of predator removal, and how the media portrays sharks and other predators.

In particular, my current PhD research examines where ocean-roaming (pelagic) sharks like to live: where they are, why they are there and whether the areas where they occur are protected. To do this I develop statistical models to analyse shark occurrence and relate this to environmental variables. I am also looking at how shark numbers and occurrence change over time: across the entire 21st century in fact.

About me

I hold a Bachelor of Applied Science majoring in Ecology (awarded with Distinction), a Bachelor of Arts in International and Global Studies majoring in Mandarin Chinese, as well as a Bachelor of Science (Honours first class) in shark and ray vertebral biomechanics from The University of Queensland.

After completing my studies I moved to Perth to do my PhD at The University of Western Australia. Having travelled to over 40 countries, and lived on three continents I look forward to more travels in 2020 ... to the UK. I have recently been awarded the 2020 Naked Scientist Prize Internship (I am very grateful to The University of Western Australia for covering my costs). I'll be spending 8 weeks living and working at Cambridge University refining my science communication skills and learning how to produce podcasts and documentaries with the BBC and The Naked Scientists!



Top Charlotte with a lemon shark in the field
Middle and bottom Charlotte sharing her passion for marine life with the younger generations

Salvador Zarco Perello– PhD Candidate

The UWA Oceans Institute | School of Biological Sciences, The University of Western Australia

'The tropicalization of temperate reefs and the temperatization of tropical herbivores'

Supervisor: Dr Thomas Wernberg (UWA), Dr Tim Langlois (UWAO), Dr Mat Vanderklift (CSIRO), Dr Tom Holmes (DBCA)

What's herbivory? Some ecological studies regard it as the *removal* (ingestion) of vegetation and some other few consider it as a two-step process by including the *digestion* (nutrition) of the consumed primary producers; however, there is a third and final step that has not received attention in studies of tropical herbivory: the *excretion* (release) of the ingested and digested vegetation. The number of steps regarded has important implications for the significance of this important ecological function, considering the three-steps herbivory changes from the traditional "primary consumption" to what I will call "primary transformation" of vegetation. Under this approach, herbivory does not remove, but transforms the canopies of vegetation, functioning as habitat-providers to other trophic guilds, to detritus of vegetation, functioning as nutrient-sources that then get recycled in the food chain. This concept has been more commonly adopted in temperate ecology, where although not defined as I just did, some studies have described sea urchin herbivory as *shredders* of vegetation. Recently, I applied this new concept while assessing the herbivory of a range-extending tropical fish in the kelp forests of southwestern Australia and found that the rabbitfish *Siganus fuscescens* has increased the rates of *primary transformation* in these ecosystems by five-fold. This was primarily on the kelp *Ecklonia radiata* but it also included seagrass and a variety of seaweeds that were floating in the water column, a process recognized as *drifting herbivory*, commonly practiced by temperate herbivores but not typically described for tropical species. The function of different herbivores is linked to the traditional *removal herbivory*, browsing and grazing relate to the ingestion step; under the primary transformation concept, I found that rabbitfish have become the new shredders in temperate reefs! The paper published, which I hope you find of interest, can be found here [doi: 10.1098/rspb.2019.2046](https://doi.org/10.1098/rspb.2019.2046) and you can find myself in tweeter as @PerelloSz



Top Salvador says cheese! **Bottom** *Siganus fuscescens* school feeding in *Ecklonia* temperate reef; photo Nina McLaren

2019 CONFERENCE, RESEARCH AND TRAVEL AWARDS

Michael Hall Awards

David Ellis – Winner

PhD Student

Australian National University

*“Determining the seasonal habitat fidelity of *Epinephelus rivulatus*”*

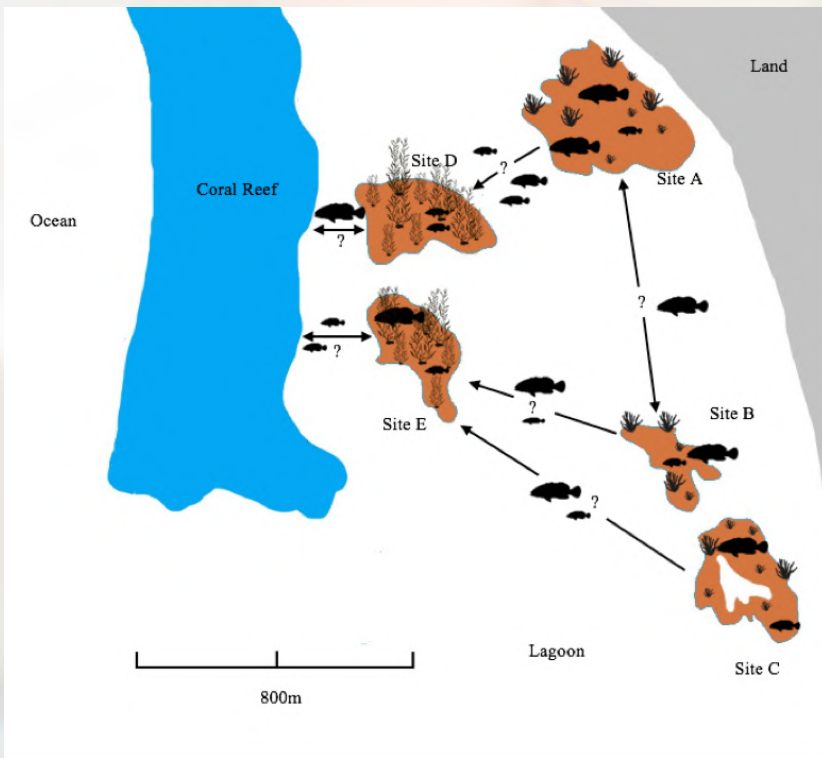
Fisheries productivity, which refers to both population growth and the somatic growth of individuals, is linked in a large part to the availability of suitable habitat(s) used by a species during their life cycle. Recent research along tropical coastlines around the world have revealed that many fishery target species utilise complex macroalgal meadows as they exhibit high rates of areal productivity and can provide complex habitat for many species.

However, these habitats come with a major catch for fishes - seasonal changes in water temperature drive major fluctuations in macroalgal canopy structure over time, such that some patches can be totally denuded during the autumn-winter months each year. Snapshot visual surveys have revealed that these seasonal shifts in seaweed canopy habitat can dramatically alter the taxonomic composition and abundance of macroalgal-associated tropical fishes. However, we do not know the fate of fishes that had occupied once-lush seaweed patches that become denuded during winter – do these fishes perish, or do they move to nearby patches that have retained some canopy cover?



Above Habeco Lab members at Ningaloo, July 2019 – (L-R) Rosalie Harris, Chris Fulton (Assoc Prof), David Ellis and Ashleigh Buckley

My research focuses on a recreational target fish called Charlie Court (*Epinephelus rivulatus*), named after the former premier of Western Australia 1974-1982. These fish are macroalgal meadows specialists found throughout the lagoon area of Ningaloo. Through my research, surveys have demonstrated their density is seasonal and not evenly distributed across sites. Furthermore, electivity indices indicate Charlies prefer complex habitat consisting of bommies and holes. With the support from ASFB, my PhD will explore what happens to Charlie Courts when macroalgal meadows undergo seasonal change. I will be catching fish underwater on a nominated site and inserting conventional dart tags for identification. Underwater surveys will be conducted prior to tagging any fish, and post tagging, to record target species density, fish movement, and habitat condition on the



Above Schematic diagram of tagging and survey sites in the lagoon of Ningaloo Reef, Coral Bay, WA showing possible movement of *Epinephelus rivulatus* in response to availability of *Sargassum* and prey items. For example, fish will be tagged on sites A and C. All sites will be surveyed to assess habitat, residence and movement of *E. rivulatus*

tagging site and across adjacent macroalgae meadow sites in this region.

This research will show if *E. rivulatus* habitat preferences persist through seasonal change to key habitat forming biota (*Sargassum* canopy) in this fringing coral reef ecosystem. Outcomes will provide managers with detailed information on productivity drivers for *E. rivulatus* and how habitat and its respective zoning can influence spatial management in the Ningaloo Marine Park. This will include greater detail for the protection of important habitat both size and position of zones. Outcomes have the potential to guide harvest strategies that account for spatial and temporal variability in habitat based drivers of fisheries productivity.

Adam T Downie - Runner Up

PhD Candidate

ARC CoE and James Cook University

'How Do Coral Reef Fishes Develop Into Athletes?'

Lateral Lines, December 2019

Supervisors: Drs. Jodie Rummer, Mark McCormick, Peter Cowman

Special thanks: Dr. Jen Whan at JCU Cairns Advanced Analytical Center, Drs. Lyle Vail and Anne Hoggett (Lizard Island Research Station directors), Lizard Island technical staff, and Caroline Phelps (undergraduate volunteer and co-author on upcoming paper)

Twitter: @AdamDownUnder

My research focuses on understanding the energetic requirements that support swimming during the early life history of coral reef fishes. I use several different techniques, spanning many levels of biological organization, such as phylogenetics, swimming respirometry, muscle histology and electron microscopy. This unique combination of techniques has allowed me to investigate, in great detail, the physiological mechanisms underpinning swimming performance of reef fish larvae.

Unlike temperate fishes, like herring, flatfish and cod, the larvae of reef fish are generally not passive particles during this phase, and are capable of remarkable swimming speeds. Indeed, being capable of swimming 20–50 cm sec⁻¹, at a size no longer than your thumb nail is impressive, and this swimming performance has been anecdotally referred to as athletic. These capabilities aren't just for show, but crucial for dispersing and finding a suitable reef to live on. But how do these fishes support such performance at such an early age? What are the physiological mechanisms underpinning dispersal and recruitment processes for reef fishes during their early life history? My research aims to answer these questions.

An aspect of my PhD is investigating whether performance changes upon settlement onto a reef, as larvae metamorphose into juveniles. The ocean and reef have distinct challenges, unique to themselves, that reef fish larvae must adjust

Right Adam Downie's piece of paradise study site at Lizard Island



to. The open ocean, where reef fish larvae primarily grow and develop, requires fast swimming capabilities to overcome intense currents. In contrast, the reef is a complex habitat, and manoeuvrability, via pectoral muscles is key for navigation. Few studies have found that maximum swimming speed significantly decreases 24 hours after larval fish settle onto a reef. Additionally, studies have shown that temperate larval fish re-organize the density of mitochondria in different muscle tissues as they move between larval and juvenile habitats, to be better suited to new environmental challenges, such as changes in water flow. Is this same pattern evident in reef fishes?

As the 'powerhouse' of the cell, mitochondria supply energy to tissues, and may limit locomotor capabilities if densities change. If mitochondria densities change in response to new challenges associated with the reef, this may change how energy is directed for swimming and other aerobic processes. Consequently, since metamorphosis is such a rapid event, reef fishes

need to physiologically adjust to their new reef habitat quickly. The Michael Hall Award will support this project, and funds will be dedicated to covering the costs for processing and photographing, via transmission electron microscopy, mitochondria in different muscle tissue types in larval and juvenile reef fishes. This is a valuable addition to this research and hopefully will underpin a critical mechanism driving recruitment and metamorphosis processes for reef fishes.

Barry Jonassen Awards

Harriet Goodrich - Winner

PhD Candidate

University of Queensland

'Optimising diets for sustainable aquaculture by reducing the energetic costs of digestion'

Fish feeds provide an avenue to directly improve fish growth efficiency, yet we know

very little about the energetic costs associated with the digestion of different diets in fish. This presents a major knowledge gap, as we know that digestion is energetically expensive and working to find ways that minimise these costs during digestion could provide scope to improve fish growth and the efficiency and sustainability of aquaculture.

For fish with acidic stomachs, some of the costs associated with digestion arise from acid secretion to the stomach. Considering this, we hypothesised that by making fish feeds more acidic we could reduce the total energetic cost of digestion in fish due to a lesser requirement for gastric acid secretion during digestion. Since the buffering properties (ability to resist changes in pH) of a feed do not change its nutritional composition, it's likely that the consumption of a relatively low buffered (or acidic) feed could create 'energy savings' during digestion that leads to improved fish growth. To test this theory, the funding awarded by the ASFB has helped to create an acid feed optimised to barramundi (based on their own digestive physiology) and run the experiments necessary to determine whether this diet can reduce the costs associated with digestion and lead to changes in fish growth. This work is still ongoing, but we hope that this idea can provide a new avenue of investigation for fish feed formulation, digestive physiology and sustainable aquaculture.

Geoffrey Mazue - Runner Up

PhD candidate –University of Sydney

geoffrey.mazue@sydney.edu.au

'Finding food in a pond may be challenging for a little fish'

Social foraging is known to enhance food discovery resulting in increased individual foraging success, but it comes at a price as individuals also suffer from higher levels of intraspecific competition. In nature, food availability fluctuates both spatially and temporarily, resulting in periodic episodes of intense competition between groupmates.

Under different scenarios of food distributions in the environment, individuals

Below and right
Harriet working on production of acidic fish feed in the lab



may benefit from adapting their foraging strategy, from paying the cost of competition associated from collective foraging, to reducing those costs by foraging on their own. Thanks to the Barry Jonassen award, I recently started the data collection of a project investigating how individuals adapt their strategy based on the spatial distribution of food resources and how individuals' differences in searching strategies affect collective patterns occurring in foraging fish shoals.



Above *Foraging guppy from Geoffrey's work*

Under laboratory conditions, I use a thick plastic grid to cover the bottom of an experimental arena which creates a matrix of 'foraging pits' containing a prey or no prey, enabling me to control the distribution of food in a standardised manner. By keeping the water shallow, individuals are forced to actively explore the arena to discover prey items as they swim over the grid. Groups of guppy fish are being repeatedly tested for a given pattern of prey distribution (e.g. scattered or aggregated preys). After tracking each individual's trajectory and foraging success from the foraging trials video recordings, I will be able to investigate how fish respond to intraspecific competition based on the spatial distribution of prey and how differences in the strategies implemented by individuals affect fission-fusion dynamics.

Gilbert P. Whitley Memorial Awards

Aaron Puckeridge - Junior winner

Honours Student

The University of New South Wales

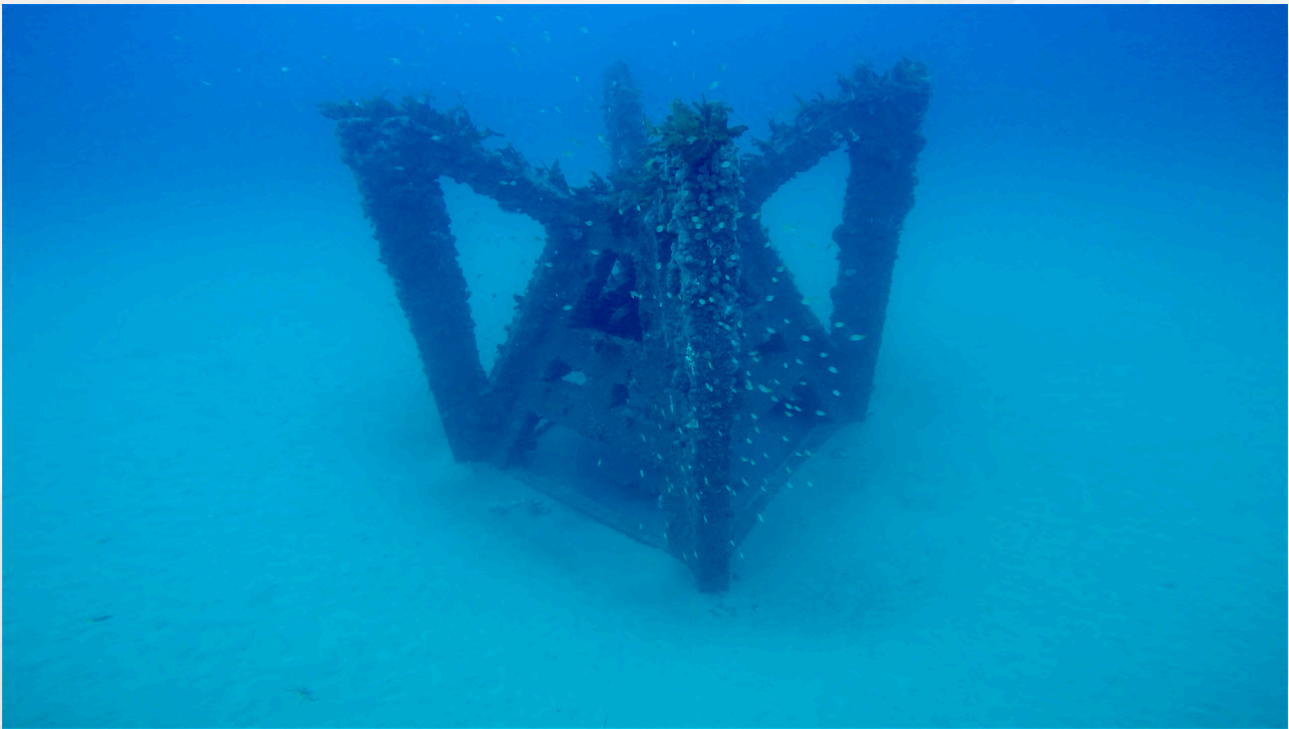
Throughout Australia, artificial reefs are increasingly being deployed as recreational fishing resources. Typical artificial reef research has focussed on large pelagic predators that are attracted to the reef to feed on baitfish. Despite this, artificial reefs have the potential to affect a much larger diversity of fish, including the

benthic predators that inhabited the soft sediments before the reef's deployment.

During my honours research I used acoustic telemetry to examine how bluespotted flathead behaved around the South Sydney Artificial Reef. To understand if flathead were using the artificial reef itself or the surrounding sediment, a finescale receiver network was deployed. This receiver network offered metre level monitoring of flathead movements.



Above *Aaron in proud display of his flathead catch*



Above A module at the South Sydney Artificial Reef, standing at roughly 5 metres tall

I tagged 48 flathead at the artificial reef, 22 of which contained accelerometers. Standardised detection counts indicated that flathead were highly associated with the artificial reef modules. Two measures of activity, accelerometer data and a movement activity index indicated consistently low activity around the artificial reef modules. Gut contents and hydroacoustic data indicated that these low activity patterns were likely feeding behaviour.

This study offered evidence that artificial reefs can offer feeding habitat for sand associated benthic predators, as well as the traditionally viewed pelagic predators, extending the attraction-production paradigm.

It was a great privilege to present my research at the ASFB conference and I am honoured to have received the Gilbert P. Whitley Award. Thank you to my supervisors, co-authors, conference organisers and the FRDC for supporting this award.

Christopher Hemingson –Senior winner

PhD student

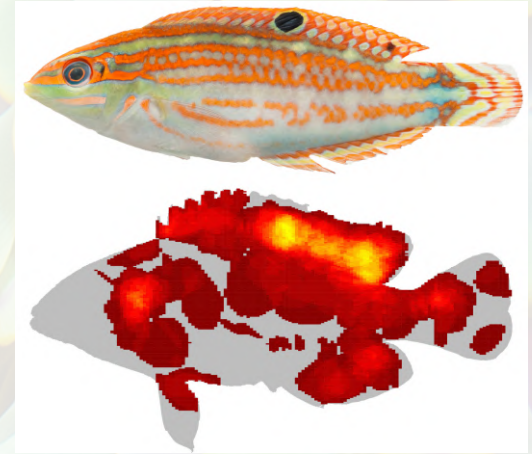
James Cook University

Colouration has historically been a tricky field to get into. Differences in how colours are created and recorded by cameras, how they are

perceived by viewers (like humans), and how they form patterns have left this field with many difficulties to overcome. Recent technological advances, however, have made this field much easier to approach. My research has capitalised on these recent techniques, utilising them in unique ways to ask questions we have never been able to ask before.

The research I presented at the ASFB conference in Canberra focused on eyespots in coral reef fishes. Eyespots, quite simply, are a colour pattern that resembles an eye allowing species that possess them to avoid predation. I investigated the distribution of eyespots within coral reef fishes and mapped where they occur on the body. In essence, the location of the eyespots likely influences exactly how it provides anti-predation benefits.

This year's ASFB conference was my second to attend. After having such a memorable experience at last year's conference in Melbourne, we managed to convince a much larger cohort from JCU to attend this year making it quite a memorable experience. ASFB fosters a great environment to discuss all things fish research; from marine to freshwater, applied to theoretical. It truly has an unmatched community where members can converse with ease about their research and experiences. I was



Left Christopher and his underwater colour palette **Above** fish camouflaging imaging for Chris's research on eyespots on coral reef fishes

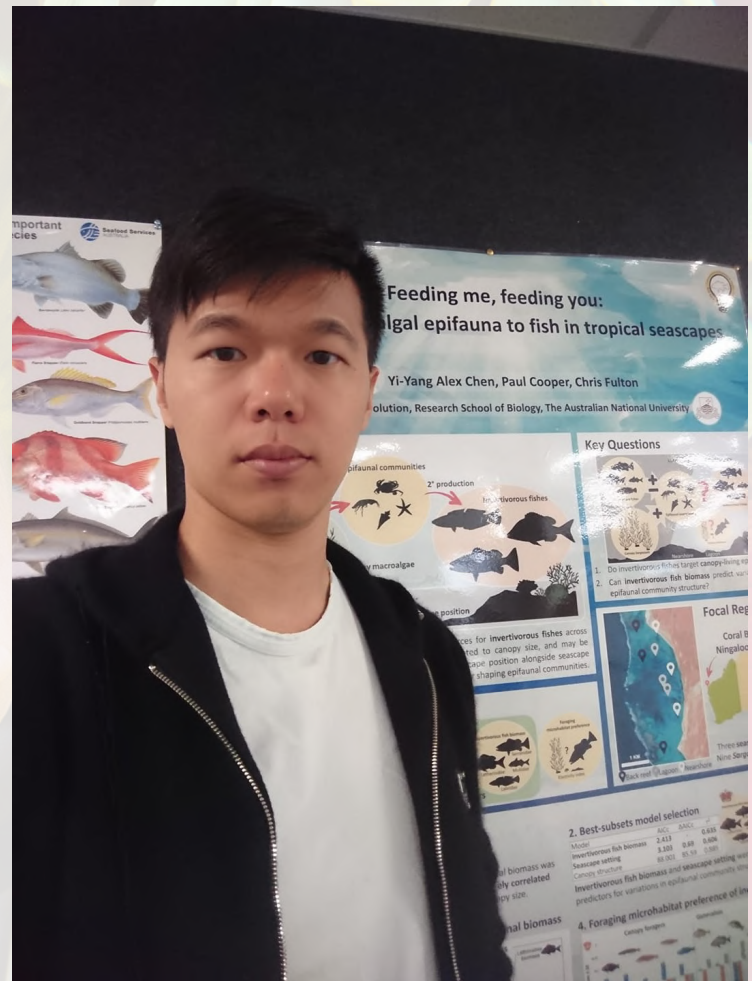
fortunate to win one of the student awards which will allow me to buy lab equipment to start photographing fishes on my own. I am thankful for the community ASFB provides and I look forward to future conferences!

John Lake Poster Award

Alex Yi-Yang Chen – Senior winner

*PhD Student
Australian National University*

As well-known productive habitats, tropical macroalgal meadows support abundant and diverse reef fish species. My study is focusing on the reef fish production within tropical macroalgal meadows in Ningaloo Marine Park. Recently we found the invertivorous fishes here have strong foraging preferences upon epifaunal invertebrates from macroalgal canopies, and the community structure of these epifauna can be predicted by invertivorous fish biomass and seascape settings. With the generous support from ASFB's award, I'm planning to have my fieldwork in Ningaloo soon - this time I'll try to reveal how much epifaunal secondary production can be consumed by invertivorous fishes.



Above Alex with his winner poster at the ASFB conference in Canberra

ASFB Opportunities



ASFB STUDENT AWARDS

The **Barry Jonassen Award** was established in 1999 and is named in memory of Barry Jonassen, a keen freshwater angler and biologist, and passionate supporter of ASFB. The award is to assist with the research costs incurred by an honours or postgraduate student in the field of freshwater fish biology or freshwater fisheries ("fish" includes commercially important invertebrates). The value of the award will be at the discretion of the Society President and Education Committee, up to a total of \$2,000. For more info [here](#).

The **Michael Hall Award for Innovation** was established in 2005 by Mr David Hall in memory of his father Michael Hall to assist innovative research in marine fish biology. The award is to assist with the research costs incurred by an honours or post-graduate student in the field of marine fish biology or fisheries ("fish" includes commercially important invertebrates). The application should show a significant contribution to science in general; a high degree of originality in choosing the research topic and methodology; the potential for significant benefits to the management of fisheries and aquaculture resources; and collaboration with other researchers. The value of the award will be at the discretion of the Society President and Education Committee, up to a total of \$2,000. For more info go [here](#).

Both awards are restricted to full time honours or post-graduate students in the first or second year or their degree. This award is open to any student member of ASFB who is currently enrolled at an Australian or New Zealand university. Applications consist of a 2 page research proposal on the proposed or underway research. The Society reserves the right not to make an award in any year. Closing date: 30th April.

The **Student Communication in Science Competition (SCiSC)** awards are aimed at creating an opportunity for early-career students to develop and demonstrate their multimedia and oral communication skills. To apply, eligible students should create & upload a video about their research, of up to 3-minutes in length to the competition page <https://www.thinkable.org/competitions>. A junior (Honours level) and a senior (Masters/PhD level) winner will be chosen via public online voting. One additional "Member's Choice" winner will also be chosen. Entries close April 30th 2017. For more info go [here](#).

Applications/inquiries for these awards should be e-mailed to:

Dr. Stephen Beatty

Tel: 08 9360 2813

E-mail: S.Beatty@murdoch.edu.au

Student International Travel Scholarship

This scholarship has been made available to support a student to present an oral paper at an international conference that is relevant to the activities of the Society, in the financial year of the award.

The scholarship comprises a return airfare, registration fees plus a living allowance up to a total value of \$3,000. The scholarship may be divided by the judges if more than one paper is scored equally. Additionally the winner will be invited to present their research at the ASFB annual conference and receive free registration.

The award is open to students who are current financial members of ASFB at the time of award presentation and have been ASFB members for at least 12 months before applying. Applicants must be either currently enrolled as a post-graduate student at an Australian or New Zealand University or have graduated within the last 12 months.

Applications are in the form of a research paper written on any aspect of fish biology or fisheries (fish includes commercially important molluscs and crustaceans). As part of the

application, candidates should nominate in writing what conference they wish to attend and its relevance to the aims and activities of the Society. The Society reserves the right not to make an award in any year if the quality of the applications does not meet the required standard. Papers should follow the general format required by Marine and Freshwater Research (or equivalent). Closing date for applications: 31st May. More information and award conditions can be found [here](#)

Applications/inquiries should be e-mailed to:
Dr Michael Hammer
Tel: 08 8999 8253
E-mail: michael.hammer@nt.gov.au

Conference Awards and Bursaries

The ASFB also offers the **John Glover Travel Fund** as a bursary for conference attendance, and the following awards for presentations and posters at the annual conference: **John Lake Poster Award**, **Victorian Marine Science Consortium Award** and a **Gilbert P. Whitley Memorial Student Award**. Awards range from \$100 AUD to \$600 AUD and can be applied for before the deadline for abstract submission at each ASFB conference.

ASFB EARLY CAREER AWARDS

The **Early Career International Travel Scholarship** has been made available by the Australian Society for Fish Biology (ASFB) to support an early career scientist to present an oral paper at an international conference that is relevant to the activities of the ASFB. Only one scholarship will be given each year, and only if a candidate of acceptable quality applies. The scholarship will provide a return airfare, conference registration and accommodation up to a total value of \$3,000, plus a full registration for the Scholar to attend the next ASFB annual conference where they will present the work as a plenary talk.

Conditions

- The award is open to early career scientists who are current financial members of ASFB at the

time of the award presentation at the annual conference and who have been financial members of ASFB for at least 12 months prior to applying for the award;

- The early career applicant must apply within 5 years of the conferral of their last postgraduate degree (either a Masters or PhD) by an Australian or New Zealand University. Extensions to this eligibility timeframe due to career breaks will be considered upon application to the Committee;
- An award will be made based on the application process outlined below.
- Judging for the award will be made by an anonymous Committee consisting of three ASFB members, and the decision of the Committee is final; and
- The ASFB Early Career International Scholar must provide a written report of their experience for publication in the ASFB Newsletter.

Applications close 31st of May.

For more information and how to apply please go [here](#).

The **Early Career Excellence Award** is given to an early career scientist who has made an exceptional advance in the study of fish biology and/or fisheries that has fundamentally changed our understanding and/or management of fishes (fish includes commercially important molluscs and crustaceans). Only one award will be made in a given year, and only if a candidate of exceptional quality is nominated.

Nominations

Nominations for the award are made by the full Executive Committee during May each year, and the winning candidate selected by a selection committee comprising a diversity of ASFB members (across age groups, gender & disciplines). For more information, or to suggest a nominee, please contact your State/Territory/NZ Representative on the [ASFB Executive Council](#) or the ASFB President. *Nominees must be ASFB financial members at the time of nomination. For more information please go [here](#).

Applications/inquiries should be e-mailed to:
Dr. Harry Balcombe
Tel: 07 37357308
E-mail: s.balcombe@griffith.edu.au

ASFB THREATENED FISHES GRANT- *New*

The Threatened Fisheries Committee, a long-established committee with an active contribution to the ASFB, has developed a new grant of up to \$5,000 AUD. The grant is aimed at supporting conservation action and research on threatened fishes in Australia, and covers freshwater, estuarine and marine environments.

This new grant targets small interventions or studies of approximately 1 year duration, for species that are on the ASFB list of threatened fishes (or are a new nomination). Students are encouraged to apply but the grant is only restricted to ASFB members. Reporting is expected via newsletter and annual conference. Full conditions, process and application details on the [website](#). Closing date: 20th December.

Applications/inquiries should be e-mailed to:
Dr Michael Hammer
Tel: 08 8999 8253
E-mail: michael.hammer@nt.gov.au

Upcoming Events



[International Society for Reef Studies Conference, Germany 2020](#)



[Australian Marine Sciences Association 2020 Conference, Sydney, 5-9 July 2020](#)



**Indo-Pacific Fish Conference
and the Australian Society for
Fish Biology**
5 - 9 July 2021, Auckland, New Zealand

General Opportunities

HAVE YOUR SAY TODAY!

Key research priorities for the future of Australian Fish and Fisheries Research

Samuel Williams and Bonnie Holmes - School of Biological Sciences, University of Queensland

In Australia, the health of our marine, estuarine and freshwater ecosystems is of critical importance. Each environment plays a significant role in our countries ecological, economic, cultural and social wealth. Burgeoning threats including climate change, resource overexploitation, invasive animals and diseases, and habitat degradation are just a few of the issues that researchers and managers must consider. In addition, issues with contrasting legislative frameworks between jurisdictions also hinders our ability to manage appropriately at a national scale.

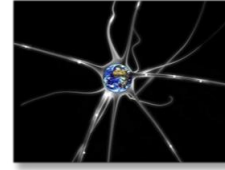
Here we are investigating what the key research priorities are for fish and fisheries research in Australia, across eight thematic fields of study. The priorities identified will enable researchers and policy-makers to identify critical knowledge gaps, promote collaborative programs, develop novel approaches, and to improve transparency around decision-making processes.

The information collected through this survey will be used to develop a paper that informs the future of fish and fisheries research in Australia. This work follows on from a similar project that was undertaken in New Zealand which identified research priorities for the country, by gaining feedback directly from the people working in this area. This project is not associated with any FRDC research project, however, we anticipate that key outcomes will be distributed to relevant agencies upon completion.

We are looking for Australian professionals (namely policy makers, researchers and academics) to provide their top three research questions on the future of Australian Fish and Fisheries Research.

To access the survey, click on the survey monkey link below. It should take no more than five minutes to complete. Survey responses are due back by **31 January 2020**. Please feel free to share the survey among colleagues - the more responses the better!

Start the survey: <https://www.surveymonkey.com/r/TZJLVZ8>



Postdoctoral Researcher, Neuroecology

Summary: An experienced Postdoctoral Researcher position in Neuroecology is available to join the School of Life Sciences at La Trobe University.

- Full time position, 3 years fixed term contract
- Role based at the Melbourne (Bundoora) campus
- \$84,834 - \$90,821 per annum plus up to 17% superannuation

About the role

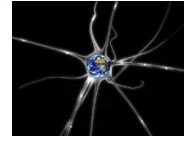
The Neuroecology Research Laboratory lies at the intersection of two major fields of biology (Neurobiology: the study of the nervous system, and Ecology: the study of the interaction between living organisms and their environment). Neuroecology bridges the gap between our knowledge of the neural bases of animal behaviour and the consequences of that behaviour in the context of an animal's habitat and ecology.

We are seeking a Postdoctoral Researcher in Neuroecology to join our team within the Department of Physiology, Anatomy and Microbiology (PAM), School of Life Sciences at La Trobe University, Victoria, Australia.

We use innovative neurobiological techniques such as molecular genetics, bioimaging, electrophysiology, anatomy and behaviour to examine how key elements of the physical environment such as light, sound, odours, and electromagnetic fields are detected and processed by the peripheral and central nervous systems and how this influences their behaviour. The ability to perceive these environmental cues is critical to the survival of each species. Model indicator species are used to assess how ecosystems may be faring in light of climate variability and habitat loss or degradation.

Skills & Experience

- Completion of a PhD in a relevant discipline. Experience as a postdoctoral researcher would be an advantage;
- Demonstrated research productivity through a strong track record in the writing of grant applications, conference papers and the publication of high-impact scientific articles;
- Ability to work effectively as a team member and independently under limited supervision,
- A strong background in neuroscience, statistics, data processing and programming (Matlab, Python and R) and a keen interest in this research area is highly desirable.



PhD Scholarships in Neuroecology (Internally Funded)

The La Trobe University **Neuroecology Group** is seeking two outstanding candidates to join our team within the Department of Physiology, Anatomy and Microbiology (PAM), School of Life Sciences at La Trobe University in Melbourne, Australia.

Our Research Laboratory lies at the intersection of two major fields of biology (*Neurobiology*: the study of the nervous system, and *Ecology*: the study of the interaction between living organisms and their environment). *Neuroecology* bridges the gap between our knowledge of the neural bases of animal behaviour and the consequences of that behaviour in the context of an animal's habitat and ecology.

We use innovative neurobiological techniques such as molecular genetics, bioimaging, electrophysiology, anatomy and behaviour to examine how key elements of the physical environment such as light, sound, odours, and electromagnetic fields are detected and processed by the peripheral and central nervous systems and how this influences their behaviour. The ability to perceive these environmental cues is critical to the survival of each species. Model indicator species are used to assess how ecosystems may be faring in light of climate variability and habitat loss or degradation.

Current Research Programs

Environmental impacts on the neural basis of behaviour

Investigating the relative importance of vision, olfaction, audition, lateral line, electroreception, gustation and magnetoreception by examining both the peripheral sense organs and the brain.

Sensory ecology of deep-sea organisms

Examining the importance of different sensory modalities by quantitatively assessing both the number of nerve axons and the relative size of the sensory brain regions that receive input from the peripheral sense organs.

Sleep and the physiological drivers of activity

Investigating behavioural patterns of circadian inactivity, and the influences of environmental light using physiological indicators of sleep (heart rate, respiration, activity patterns and muscle activity) and the non-invasive recording of brain waves.

Your Role

The successful candidates will be expected to conduct research under the guidance of Prof Shaun P. Collin (<https://scholars.latrobe.edu.au/display/scollin>), with the aim of obtaining a PhD in Neuroecology. They will also be expected to contribute to the department's many activities, including seminars, teaching, outreach and various other research related events.

You should:

- be enthusiastic and highly motivated to undertake further study at an advanced level with a keen interest in the research themes of the Neuroecology Group;
- be able to demonstrate strong academic performance in subjects relevant to neuroanatomy, sensory ecology, and/or behavioural neuroscience and have a strong desire to learn new and complex analytical techniques applicable to these subject areas;
- have strong written and communication skills, with the ability to work independently and in a team-oriented context.

Executive Council Meetings

Minutes ASFB Executive Council Meeting Thursday 29th of November 2018, 1100-1300 AEDT Teleconference

Executive Council members: Harry Balcombe, Alison King, Chris Fulton, Lenore Litherland, Charles Todd, Brendan Ebner, Kathy Cure, Andrew Katsis, Matt Beitzel, Nastaran Mazloumi, Joel Williams, Keller Kopf, Mike Hammer, Krystle Keller, Gerry Closs, Malcolm Francis, Leanne Currey-Randall, Mischa Turschwell, Gretchen Grammer, Chris Bice, Sherrie Chambers, Emily Lester, Sean Tracey, Jonah Yick, Scott Raymond, Kylie Hall, Adrian Gliess, Emily Fisher

Apologies:

Matt Beitzel, Joel Williams, Keller Kopf, Mike Hammer, Krystle Keller, Sean Tracey, Jonah Yick, Scott Raymond, Adrian Gliess.

Agenda

1. Welcome / apologies
2. Minutes from previous meeting
3. Actions from previous meeting
4. New members and treasury report
5. Student & State Representative reports
6. Newsletter
7. Communications
8. Melbourne 2018 update
9. Canberra 2019 update
10. World Fisheries Congress 2020 update
11. IPFC Auckland 2021 update
12. Update on STA (including Science Meets Parliament)
13. Changes to constitution update following Melbourne Conference
14. Incident arising from Melbourne Conference
15. Future of the Society Committee
16. New Contract for ASFB Communications Manager
17. Sponsorship for a session at SETAC July 2019 Conference
18. Nominations for International Fisheries Science Prize (2020)
19. Other Business
20. Next meeting

Minutes compiled by Charles Todd

1. Welcome and apologies

Harry welcomed everyone to the meeting, returning members and new members alike.

2. Minutes from previous meeting

Harry motioned to accept the minutes from the previous meeting and Chris Fulton seconded the motion, the motion was carried.

3. *Actions from previous meeting*

Action: For the Executive to form a sub-committee in the near future to discuss suitable 50th celebrations (Item 15)
Outstanding – agenda item for next meeting.

New Actions

From 12: Actions from previous meeting

Action: Harry to establish a committee to look in to future voting options for Constitution (Item 15)

Action: Future agenda item. (Newsletter)

Continuing

Action: Harry and Andrew to discuss appointment of a second ASFB representative. (Item 10)

Action: Harry to form a sub-committee to draft a Code of Conduct (Item 14)

Action: Senior Executive Council officers to approach FRDC about new funding contract.

Chris suggested we need a travel bursary to subsidize travel to the conference for people from developing nations across the Indo-Pacific (including African nations).

Action: To remain a focus for future conferences starting with Canberra.

4. *New members and Treasurer's report*

Lenore reported that the Society has currently 423 members including 128 student members. There are 5 new/renewing members. Lenore proposed to accept the new members, seconded by Harry, the motion was carried unanimously.

Lenore presented the Treasurer's report.

Current status of our bank accounts and term deposit accounts as follows:

•Current status of our bank accounts and term deposit accounts are as listed:

•NAB (ASN operating account) \$8,878

•BOS – \$13,026

•BTA – \$12,004

•Term deposit \$21,357

•Term deposit \$233,292

•ASFB are in good financial standing with approx. \$288,057 in the bank

We are in good financial standing.

Chris Fulton asked about the about cash from the past conference. Lenore responded that not all receipts are in yet. Chris reported that there was still a final invoice to come in from FRDC.

Kylie proposed to accept the Treasurer's Report, the motion was seconded by Chris Bice, and the motion was unanimously carried.

5. *Student & State Representative reports*

Leanne reported that OCS contacted her about combined conferences, too late in our planning though. Leanne wants to initiate a networking event next year, seeking ideas on how that might run. Emily Fisher said the WA annual lawn bowls event was successful, using the \$500 budget to order pizzas for all attendees not just members. Alison reminded the State reps to please let the Executive Council know when these events are held, and that they can be varied in style (eg social, networking, formal/informal presentations).

Gretchen welcomed Chris Bice as new State Representative for South Australia. Gretchen reported that there were quite a few submissions for the newsletter, which is good. Gretchen would like to do a similar get together as other states.

Kylie reported that there were a number of good responses for the newsletter from Victoria.

Emily Lester reported contacting members in WA for contributions to the newsletter and hoping to get some informal talks happening.

All new Executive Council members welcomed.

6. *Newsletter*

Kathy reported to the Executive Council that the newsletter is all on track. This Friday is the absolute deadline for contributions.

Harry asked about how the guidelines went. Kathy responded that some members ignored them, and some members were diligent in sticking to the guidelines and that State Representatives were a little disorganised.

Action: Charles to send extraordinary meeting minutes to Kathy.

7. *Communications*

Andrew presented the Communications report. The Australia's Favourite Fish contest had 1200 votes, and the winning species was the leafy sea dragon, just beating Murray cod. We received a good social media response to the conference and contest. Andrew wants to conduct a social media survey, to gauge who is following our social media accounts, why they do so, and what future content people would like to see.

8. *Melbourne 2018 update*

Harry reported that Melbourne was a really well run conference and Harry thanked John Murrongiello and the organising team; and for anyone who missed it to read the full report in our December Newsletter. Harry expects that the conference will return a slight profit. There were 242 delegates which was quite a large conference for ASFB exclusively, Harry

also pointed out that the conference saw the re-engagement of Fisheries Managers.

9. Canberra 2019 update

Chris Fulton reported that the organising team were very close to the conference website launch in December. A total of 9 special sessions are now fully developed on the topics of: aqua-geography, conservation, art in science communication, cultural flows, aquatic translocations & invasives, social & reproductive behaviour, genetic applications, monitoring, and fisheries management. More details will be available on the website.

One session will be targeted around “Big messages for decision makers”: going to invite Department heads, CEOs, GMs and other decision-makers and influencers to attend the session, where presenters will provide speed talks on a single key idea they think will improve fish/fisheries into the future. More details will be available on the website in December. The conference is timed to coincide with the sitting of parliament to maximise the chance that key people will attend the event.

We have the four ASFB award speakers lined up already and are proposing to have a dedicated communication workshop at the beginning of the conference where a series of speakers will cover a range of issues in communication, followed by a panel-style question-answer session.

The main conference venue is the National Library of Australia, which is where the welcome pre-conference workshops and welcome reception will be held on the first day (Monday 14 Oct).

Because it is a parliamentary sitting week it is important to book accommodation early and to look beyond the Parliamentary triangle area. One suggestion is to look for accommodation in the New Acton area, which is ~20mins walk over the bridge from the National Library.

10. World Fisheries Congress 2020

Harry gave the Executive Council a brief update, basically the organising committee have worked very hard to get things up and running. Even though ASFB has members on sub-committees, not everyone has been able to make all the meetings. Harry asked for additional support to make sure all meetings are covered.

Chris Fulton added that some of the sub-committees are asking questions outside their focus or role, making the process somewhat convoluted and difficult. It was agreed that the correct approach was to contact the ASFB President in such circumstances.

Kylie asked if she could be an alternative member on the Program sub-committee (Alison already a member)). Harry said it was absolutely encouraged. Alison to become an alternative member of the organising steering sub-committee

(Harry and Steve Beatty already on this committee). We definitely need another member on the communication sub-committee (no volunteers). Education sub-committee is well covered.

Alison asked the key people involved on the sub-committees, do we want to send them key documents? Harry agreed it was a good idea to circulate information amongst all sub-committee members.

11. IPFC Auckland 2021 update

Gerry informed the Executive Council that there is an updated conference agreement. Harry to check insurance requirements and once everything is agreed to Gerry will forward the documents to ASFB for signoff.

Harry asked whether anyone had ever heard of insurance cover being requested for a conference event; as University of Auckland has specified the client (ASFB) needs to have public liability insurance for \$3000000. Gerry didn't know.

Chris asked why does the insurance fall to us and not the venue. Harry said that is right but wondered if it was adequate.

Action: Harry will contact Ross Thomson former AFSS President as an Australian Society who had previously held an international (NZ) event and will also seek out the events group at Griffith University for further advice.

12. STA

Harry provided a brief update on STA after attending their AGM in Melbourne in November. They are very active at the moment, conducting a lot of work on behalf of scientists. STA has been working hard on developing equity and gender guidelines which will be useful as we refine guidelines. They also voted in a new President (Dr Jeremy Brownlee, Griffith University) who will take over next November.

13. Changes to the constitution

Harry reported that at the AGM changes to the constitution were presented to the AGM and that all resolutions were passed. However, the Associations Incorporation Reform Act 2012 in which ASFB is incorporated requires that: Each member of the association who is entitled to vote at general meetings must be given at least 21 days' notice of the proposed resolution, in the manner provided by the rules of the association.

- (3) The notice must—
 - (a) specify the date, time and place of the general meeting at which the resolution is intended to be proposed; and
 - (b) state in full the proposed resolution; and
 - (c) state the intention to propose the resolution as a special resolution. As this was not undertaken the changes to the constitution could not be submitted to CAV.

A notice will be sent to the ASFB membership at least 21 days prior to the next AGM, outlining the purpose of the changes as

already done at the Melbourne AGM. Once the manner of notification is conducted correctly and the resolution passed the Society can immediately operate under the changed constitution.

Kathy asked about what to put in the newsletter. Harry responded that the AGM minutes will be fine.

Action: Charles to draft notice to be sent to the ASFB membership prior to the next AGM.

14. Incident from Melbourne conference

Harry reported that there was an incident of harassment at the Melbourne Conference dinner. Briefly, quite late in the night members of the organising committee and myself were alerted to an incident of sexual harassment by a male towards a female student member. Myself and members of the organising committee took immediate steps to ensure the student was supported and believed and instigated immediate action.

The student reported this incident to her university to ensure they were aware and would take action if they felt it necessary. They took no action and given this male attendee (Mr A) was not a member of ASFB we are limited in what we can actually do. Mr A contacted me on the following day without prompting and (while he had no knowledge of the incident) accepted responsibility and offered a full apology to the student via email to me which I relayed to the student. The student asked that I delay any action until her university was contacted and provided advice. They chose not to respond at which point the student was asked what action she would like the Society to take.

Given the apology, she was happy for us to write a letter of complaint to Mr A. I drafted a letter which was commented on by the Vice-President and the Past-President and sent this to Mr A expressing our disappointment of his behaviour and again he accepted our criticisms. This letter was forwarded to his organisation which then had a process to work through, which did not involve us.

Overall, the outcomes of this were that the student was satisfied by our immediate action and felt well supported by the Society and also felt she had options for action (i.e. people to report to at the dinner). The student was satisfied with the apology and process. This can be discussed further in relation to Code of Conduct and expectations of behaviour for our future events had expected action from them.

Andrew Katsis said that in the past we have banned the perpetrator from future conferences, is this being considered? Chris Fulton pointed out that we can do this through ASN even though the person in question is not a member.

Chris Fulton stated it was deeply disappointing that this is the 2nd year in a row where the Society has had to deal with inappropriate behaviour. However, it is good to note the cultural change happening here, as the student felt they could report the incident immediately at the dinner. Chris Fulton asked what can we do in future events such as at Canberra 2019? Charles suggested that the President remind all dinner attendees to respect and look out for each other. Alison pointed out that we could get delegates to sign a code of conduct when registering for a conference, that way there is an expectation of behavior that the Society expects from attendees.

Chris Fulton agreed that the mentioning of the code of conduct early in the conference, pointing out officers of the Society the people can approach if they feel uncomfortable. We need this code to be drafted ASAP to be ready in time for ASFB 2019.

Gretchen agreed with Alison about having delegates sign a code of conduct when registering and suggested that the code is also mentioned/gone through at the start of the conference as part of general housekeeping.

Nastaran wondered if the one of the committee members can be an officer for harassment? Alison responded that it may be difficult to implement quickly, and should be discussed alongside the code of conduct; but having a diversity of people available for people to be comfortable to speak to is important, however having someone whose sole focus is these types of issues may be useful.

Discussion around developing a code of conduct for conferences and it needs to be applicable to all future conferences not just conference specific.

Action: A subcommittee was formed to develop an interim code of conduct Kathy, Alison, Brendan, Harry, Chris Fulton. Leanne also agreed to be on the sub-committee after the meeting.

15. Future of the Society Committee and other Committees

Harry pointed out that we need to run this committee again due to the complexity of Society life. Harry said the current senior Executive Council should be on the committee and asked who else should be on it. Chris Fulton suggested a formal EOI be put to members to ask them the issues concerning them.

Leanne said there were members who wanted to be involved in the Society, and this is a perfect opportunity.

Action: Harry to draft a proposed composition of the FoS and develop an EOI to be sent to membership.

Other committees required – Awards Working Group – Nominations requested for 2 groups (1. ECR Awards – International travel prize and ECR Excellence – 2. KRA award)

Leanne, Alison and Charles nominated for the AWG. Chris Fulton suggested contacting past-Presidents about how certain processes came about, to understand why things have developed the way they have, as means to not reinvent the wheel. An example of this was how the EC awards process was evolved by Bronwyn Gilanders, then Gary Jackson (an issue currently under discussion among the senior Executive Council).

Brendan pointed out, as an example, that it was difficult this year to assess the posters across fisheries science and fisheries management. Chris Fulton agreed there is a deep philosophical issue here that requires a clear process. For example, how do we rank the contributions of a scientific illustrator against a traditional academic that published written articles with citation metrics? This is exactly the sort of issues to be discussed by the FoS Committee.

Nastaran asked if there were awards for non-student members. There are (early career). Alison pointed out that some care needs to be taken here about avoiding award overload.

Harry also pointed out that we need a committee to develop the 50th anniversary celebrations at the next meeting.

Action: Agenda item for next meeting

16. New Contract for ASFB Communications Manager

Harry pointed out that Andrew hasn't had a pay rise in 4 years. Andrew does a great job in all areas of communication. Harry thinks the role has increased in its demand and responsibilities required and a rewording of the contract to reflect this increase in demand and roles. Gretchen pointed out that Andrew has taken this position to a much higher level than the original contract outlined. Chris Fulton suggested putting a new clause called performance where additional financial reward may be attached. Kylie said that updating the roles was important.

Harry proposed to increase Andrew's annual remuneration to \$8,000 to commence in January 2019., Chris Fulton seconded the motion, the motion was carried unanimously.

Action: Harry and Gretchen to develop a new contract for the ASFB Communication Manager and have it to Andrew by December 2018 for signing.

17. Sponsorship for a session at SETAC July 2019 Conference

Dr Kathryn Hassell (VP of SETAC) and ASFB Member has asked if we (ASFB) have an interest in sponsoring (and co-Chairing) a session on fish and pollution/environmental stressors at the SETAC conference in Darwin July 2019. We are currently sponsoring the Fish Passage Conference in

Albury and Dec – which will be attended by a fairly large ASFB Contingent.

Discussion on whether this was an appropriate sponsorship to consider. The consensus was that it was not as it is generally not our business to sponsor events.

18. Nominations for International Fisheries Science Prize 2020

Chris Fulton informed the Executive Council that AFS are asking for nominations for International Fisheries Prize for WFC 2020.

Harry asked who the champion for this prize nomination is? Chris Fulton responded that the President is.

Charles asked what the process is. Chris Fulton said it could go out to all members for suggestions, from which the Executive Council can decide who is the ASFB nomination for 2020.

Harry asked the Executive to consider possible nominees.

19. Other business

20. Next meeting

Early March 2018

Minutes ASFB Executive Council Meeting Thursday 7th of March 2019, 1100-1300 AEDT Teleconference

Executive Council members: Harry Balcombe, Alison King, Chris Fulton, Lenore Litherland, Charles Todd, Brendan Ebner, Kathy Cure, Andrew Katsis, Matt Beitzel, Nastaran Mazloumi, Joel Williams, Keller Kopf, Mike Hammer, Krystle Keller, Gerry Closs, Malcolm Francis, Leanne Currey-Randall, Mischa Turschwell, Gretchen Grammer, Chris Bice, Sherrie Chambers, Emily Lester, Sean Tracey, Jonah Yick, Scott Raymond, Kylie Hall, Adrian Gleiss, Emily Fisher

Apologies:

Matt Beitzel, Mischa Turschwell, Gretchen Grammer, Chris Bice, Sherrie Chambers, Emily Lester, Scott Raymond, Krystle Keller, Nastaran Mazloumi.

Agenda

1. Welcome / apologies
2. Minutes from previous meeting
3. Actions from previous meeting (Harry)
4. New members and treasury report (Lenore)
5. Student & State Representative reports (All)
6. Newsletter (Harry)
7. Communications (Andrew)
8. Canberra 2019 update (Chris)
9. World Fisheries Congress 2020 update (Harry)
10. IPFC Auckland 2021 update (Gerry)

11. STA – rescheduled Science Meets Parliament
12. Threatened Fishes Committee (Michael)
13. Code of Conduct update
14. Student fellowship/exchange between AFS and ASFB
15. Other Business
16. Next meeting

Minutes complied by Charles Todd

1. Welcome and apologies

Harry welcomed everyone to the meeting.

2. Minutes from previous meeting

Harry Balcombe motioned to accept the minutes from the previous meeting and Alison King seconded the motion, the motion was carried unanimously.

3. Actions from previous meeting

Action: For the Executive Council to form a sub-committee in the near future to discuss suitable 50th celebrations
Outstanding – agenda item for next meeting.

Action: Future agenda item. (Newsletter)
Continuing.

Action: Senior Executive Council officers to approach FRDC about new funding contract.

Action: Charles to send extraordinary meeting minutes to Kathy. Done.

Action: Harry will contact Ross Thomson former AFSS President as an Australian Society who had previously held an international (NZ) event and will also seek out the events group at Griffith University for further advice.

Standard insurance for Auckland University, there is no issue for the expense and has been sorted. Done.

Action: Charles to draft notice to be sent to the ASFB membership prior to the next AGM. Not done

Action: A subcommittee was formed to develop an interim code of conduct Kathy, Alison, Brendan, Harry, Chris Fulton. Leanne also agreed to be on the sub-committee after the meeting. Code of conduct has been developed see agenda item. Done.

Action: Harry to draft a proposed composition of the FoS and develop an EOI to be sent to membership. Still working on it, item for next next agenda.

Action: Future of the Society Committee and other Committees, agenda item for next meeting. Ongoing.

Action: Harry and Gretchen to develop a new contract for the ASFB Communication Manager and have it to Andrew by December 2018 for signing. Done.

4. *New members and Treasurer's report*

Lenore reported that the Society has 423 members which includes 133 student members, the numbers have not changed much.

Lenore proposed to accept the 7 new members, Kylie seconded.

Lenore reported on the Society's bank balances:

- NAB (ASN operating account) \$30,643
- BOS – \$13,042
- BTA – \$12,111
- Term deposit \$21,357
- Term deposit \$233,292

Lenore reported that the Society was in a sound financial position.

Lenore asked about FRDC contract, Chris F. said that as soon as they approve the final report we can issue the last milestone invoice. New contract is currently being neg.

Main income has been from membership \$8946 and sponsorship \$18000. Major expense has been prizes and awards \$29595 (higher than previous years as anticipated due to increased awards). Financial reports for year to date and the 2018 conference were circulated.

Committee meeting expense are lower, and there has been no social events so far.

Lenore proposed to accept the Treasurers Report, Kathy seconded the motion, the motion was carried unanimously.

5. *Student & State Representative reports*

Qld: Mischa has been looking at having an event in Brisbane, Leanne is also seeking interest in an event in Townsville – associated with Pint of Science

WA: Emily reported a lawn bowling social event was scheduled for March 8, will report on attendance at next meeting.

Tas: Jonah reported on that they are finished up on season with carp monitoring, carp numbers are low.

NZ: Gerry reported that the National Museum has said that fish has had its day, they have a major fish collection and is highly controversial. This is an international problem, with a letter of protest being organised. A link will be put up through the ASFB facebook page.

ACT: Chris reported that members are actively working on the 2019 conference.

NSW: There have been a number of significant fish kills in the Darling River that our members are dealing with.

6. *Newsletter*

Kathy reported that there were some problems uploading the newsletter, mainly due to images. In consultation with ASN Kathy has had this fixed. Kathy asked whether we should be adhering to newsletter guidelines and not accept oversize reports. Some discussion on ensuring that members stick to the guidelines with agreement that it is the State Representatives responsibility to ensure submission guidelines are met (e.g. Leanne said representatives can shorten received submissions, with member approval)

Some images are compressed when sent in a word doc, so high quality is needed for photos for the newsletter. Images also need to be sent standalone not embedded in text

Kathy discussed timing of when to call for submissions.

Lenore agreed that making the call a bit earlier will give Kathy a bit more time to put the stories together.

7. *Communications*

Andrew reported that we have reached 2000 twitter followers, and facebook is 6687. This month, Andrew will put out a survey for our social media followers asking about who they are and what content they are interested in.

8. *Canberra 2019 update*

Chris Fulton reported that planning for ASFB2019 is progressing well, with most logistics and major programming complete. We now have 10 special sessions, with the recent addition of one on fish kills in the Murray-Darling Basin. We have locked in our six invited speakers for a forum on communication that will cover a diversity of experiences and ideas in the visual arts, digital media, photojournalism, and power of the written and spoken word for conveying your message to the masses. The forum will involve a series of TED-style short talks, followed by a good chunk of time for questions and answers with the panel of speakers. We're also excited about the suite of pre-conference workshops (to be held on 14 October) to help delegates improve their skills in communication. The final touches are being put to the website before opening of registrations next week (11th of March). Expect to see an e-mail from our secretariat in due course.

Registration will open around the 11th of March, with the other key dates being 10th of May for abstract submissions and early bird registrations closing on 5th July 2019.

9. *World Fisheries Congress 2020 update*

Harry reported that the program subcommittee had been working hard with over 120 EOI's for special sessions/workshops distilled down to about 30 covering a wide array of topics. These included the proposals from the Education subcommittee chaired by Steve Beatty.

Alison said they are also looking for keynote speakers and asked for any input.

Harry reported that there had been some misunderstanding from the Sponsorship committee that ASFB would not be prepared to provide general sponsorship to the WFC2020. However, this has never been the case and we will be providing support in the education and international engagement space.

Chris Fulton commented that he had spoken to Bronwyn Gillanders recently, and urged the committee to make a decision on the amount and type of funding we'd like to provide, so we tell the WFC2020 organising committee to ensure this is finalized now. Past discussions suggested a key area for sponsorship is of students/early career people from developing nations in Oceania, so could we put a dollar figure into a sponsorship proposal to the WFC2020.

Harry agreed we want to get people from the region involved and we should just go ahead

Chris Fulton said that we should also include such travel support (for people from developing regions of the Indo-Pacific) as a key objective in our next application to the FRDC for sponsorship of ASFB activities.

Brendan said if we do fund something in this space, then it should be about empowering not just finding travel.

Chris Fulton pointed out that AFS (and International Fisheries Section in particular) also likes the idea such initiatives and we should work with them to ensure they are supported for WFC 2020 and beyond.

Action: Brendan to put some draft words together for the Awards Committee to review on an international sponsorship package by the end of March.

Action: Harry to discuss with Steve Beatty to get his input in to this package and Bronwyn Gillanders should be cc'd in all communications around this

10. IPFC Auckland 2021 update

Gerry contacted Auckland Event Services manager, web page is being developed and they have appointed a conference manager to keep things rolling along.

Harry asked when things will ramp up, Gerry responded he thought later this year.

Harry reiterated how important this event is as it will be celebrating ASFB's 50th anniversary.

Gerry wondered if it might be possible to have 2 websites, one for the IPFC and one for ASFB. Chris pointed out that we wouldn't have ASN support that year for the conference.

Alison asked why we can't have both in the webpage; Gerry thought that would be fine. Andrew suggested a redirect is easy to organise.

Action: Gerry to talk to Auckland Event Services manager about setting up the appropriate weblinks.

Harry asked about how to organise things for the ASFB 50th. Chris Fulton said that Kevin Rowling has often discussed the history of the ASFB with him, and had recently given him the back catalogue of past ASFB newsletters for digitization. This provides a wealth of material to draw upon, so we can show some of the highlights since 1971.

Harry asked if Kevin Rowling wanted to be involved, Chris Fulton thought he would.

Keller suggested inviting past presidents to be involved. Chris Fulton agreed and reminded Andrew about a discussion they had to interview past presidents about their perspectives of the ASFB during their tenure and since. Brendan expressed the view that this is a wonderful way capture these stories.

Harry pointed out that we may need to assist some people to get to Auckland.

Action: 50th anniversary development, ongoing.

11. STA

Harry met with Dion Pretorius STA Communications and Policy Manager and they are working hard and developing a range of online tools that members will have access to including the development of equity and diversity policies, budget management, social media etc and these will come online soon. Also, the Science Meets Parliament has been fully revamped and rather than being in February it will be from August 13-14. This will be a big opportunity for Science to get some influence given it will be post-election. It will be important that we have two good representatives who can commit well in advance and be fully engaged in the event.

Action: Send Harry an email to express your interest in attending Science meets Parliament on the 13th and 14th of August 2019

12. Threatened Fishes Committee

Michael update the Executive Council on the recent events. The successful 'Saving Threatened Fishes' workshop at the Melbourne ASFB conference had been wrapped up through publication of proceedings in the December newsletter.

Applications for the new ASFB threatened fishes grant closed in late December, with four high quality applications received. Judging by the TFC has been completed with the winner to be notified and announced shortly.

Harry asked about who much interest there was in the new grant and if there had been any other feedback. Michael suggested more applications would be ideal, but that the first successful grant should build greater awareness of the program. Only positive feedback on having such a grant received to this stage.

Many members of ASFB and the TFC were involved with the first IUCN Red List Threatened Species assessment for Australian freshwater fishes in Melbourne over 11-15 February. The group got through all species, with assessments currently being reviewed by IUCN.

Alison pointed out that special recognition needs to be given to Mark Lintermans for his work on championing and running the listing process.

13. Code of Conduct update

Harry said that one thing not covered in the document presented to the Executive Council is that we discussed previously having a nominated 'safe person' at the conference that people can approach if needed.

Lenore suggested having it as a general recommendation in the document.

Alison pointed out in some workplaces they have designated people that have had special training as contact officers, so they can deal with personal circumstances and any legal issues that may arise from providing advice. Given the closeness of this conference we may need more people to be able to assist with the upcoming conference. Kylie agreed and also indicated that she would be happy to be nominated. Leanne also thought training is a very good idea.

Harry questioned about paying for the training for this and the risk of those trained not being able to attend a given conference.

Keller if we can get one or two trained up who will be around most of the time then this is one way of making it a bit more practical.

Joel wondered if ASN could provide some advice on the best approach to take.

Leanne clarified that by training she meant that it would be good to provide guidelines to Executive Council members highlighting as to what to/not do if someone approached an Executive Council member.

Chris Fulton requested that we agree on a mechanism for how people can approach ASFB contacts to discuss their concerns or make a complain under the new Code of Conduct, so we can something in place in time for ASFB2019 registrations process. Chris suggested flexibility is important, and so perhaps we can just state that people should approach anyone on the Executive Council who they feel most comfortable to talk with.

Harry proposed that any issues arising at the conference the point of contact is anyone on the Executive, Charles seconded the proposal. Motion carried.

Alison asked if the Code of Conduct will be part of the online registration process. Chris Fulton replied that an applicant will have to check a box to say they have read the Code of Conduct and agree to abide by the Code of Conduct (regardless of whether they are members or not) when they register for ASFB2019.

14. Student fellowship/exchange between AFS and ASFB

Harry reported that AFS has proposed that we develop a student fellowship/exchange between our organizations, something akin to what AFS currently does with FSBI. This was discussed among AFS officers at a recent retreat and all were supportive of the idea. Of course, the devil is in the details! AFS Fisheries Management Section covers the AFS costs associated with the FSBI exchange. They may wish to sponsor something similar with ASFB or another one of our Section's might want to support the exchange, AFS President, Jesse Trushenki will explore such options from the AFS perspective. At this stage AFS just want to know if we are committed to this and we can then go from there.

Chris Fulton asked if we think it should be a competitive process. Harry responded in the affirmative and thought it should be, he concluded that there is no other way to do it.

There was a lot of discussion on a variety of ways this may work, and the cost of doing this type of thing. However, there was overwhelming support this was a great initiative.

Brendan pointed out that it may be best to match this with our interest in helping create opportunities for students or early career in Oceania.

Chris Fulton agreed and reiterated that this could be part of our next proposal to the FRDC for support of such conference activities.

15. Other business

Harry mentioned that the NSW Fisheries Science Committee, we put out an EOI and Mark Lintermans was put forward and his position was made 18 months and not 3 years. Given the intent that the EOI was for three years then we should allow Mark to continue. The Executive Council agreed.

Action: Harry to let Mark know to continue.

Chris Fulton asked if there were nominations for the International Fisheries Science Prize. Harry said not yet, but we better get moving on this, as nominations are due in May. Chris Fulton asked if Andrew had been contacted about this after posting details on social media, and he had not. Chris Fulton also asked how we will do this as the Executive Council won't meet before it's due. Harry said that we have a week to come up with a nomination.

Action: Harry will email all Executive Council members today requesting nominees by Friday March 15.

16. Next meeting

Late July early August

Minutes ASFB Executive Council Meeting Tuesday 8th of August 2019, 1100-1300 AEDT Teleconference

Executive Council members: Harry Balcombe, Alison King, Chris Fulton, Lenore Litherland, Charles Todd, Brendan Ebner, Kathy Cure, Andrew Katsis, Matt Beitzel, Nastaran Mazloumi, Joel Williams, Keller Kopf, Mike Hammer, Krystle Keller, Gerry Closs, Malcolm Francis, Leanne Currey-Randall, Mischa Turschwell, Gretchen Grammer, Chris Bice, Sherrie Chambers, Emily Lester, Sean Tracey, Jonah Yick, Scott Raymond, Kylie Hall, Adrian Gleiss, Emily Fisher

Apologies:

Brendan, Nastaran, Keller Kopf, Mike Hammer, Malcolm Francis, Sherrie, Kylie Hall, Scott Raymond, Adrian Gleiss.

Agenda

1. Welcome / apologies
2. Minutes from previous meeting
3. Actions from previous meeting (Harry)
4. New members and treasury report (Lenore)
5. Student & State Representative reports (All)
6. Newsletter (Harry)
7. Communications (Andrew)
8. World Fisheries Congress 2020 update (Harry)
9. IPFC Auckland 2021 update (Gerry)
10. Canberra 2019 update (Chris)
11. Constitutional requirements for the Canberra AGM (Charles)
12. Other Business
13. Next meeting

Minutes compiled by Charles Todd

1. *Welcome / apologies*

Harry welcomed everyone to the meeting.

2. *Minutes from previous meeting*

Alison motioned to accept the minutes from the previous meeting and Gretchen seconded the motion, the motion was carried unanimously.

3. *Actions from previous meeting (Harry)*

Actions from previous past minutes before last meeting held on 7th of March 2019

Action: Senior Executive Council officers to approach FRDC about new funding contract. Done, one year extension approved for 2019. New contract negotiations for 3 year contract to be conducted.

Action: Charles to draft notice to be sent to the ASFB membership prior to the next AGM. Done agenda item

Action: Harry to draft purpose and preliminary scope of the Future of the Society committee and develop an EOI to be sent to full membership. Harry still working on it, item for next agenda.

Action: Future of the Society Committee and other Committees, agenda item for next meeting. Ongoing.

Actions from meeting held on 7th of March 2019

Action: Brendan to put some draft words together for the Awards Committee to review on an international sponsorship package by the end of March. (World Fisheries Congress 2020 update). Not as yet.

Action: Harry to discuss with Steve Beatty to get his input in to this package and Bronwyn Gillanders should be cc'd in all communications around this (World Fisheries Congress 2020 update). To be discussed at the next ed committee

Action: Gerry to talk to Auckland Event Services manager about setting up the appropriate weblinks. (Auckland 2021). Gerry stated website is up, but the link is an unusual address, and this will be fixed.

Action: 50th anniversary development. To be discussed at first meeting of the next executive. (Auckland 2021)

Action: Send Harry an email to express your interest in attending Science meets Parliament in November (STA). Not done, delayed to be certain that our representatives are definitely free to attend.

Action: Harry to let Mark Lintermans know to continue. (Other business NSW Fisheries Science Committee - Re: Mark Lintermans). Done – Mark is continuing in the role.

Action: Harry will email all Executive Council members today requesting nominees by Friday March 15. (Other business Re: International Fisheries Science Prize). Done.

4. *New members and treasury report (Lenore)*

Lenore reported that the current membership is 411, a slight drop since the last meeting. Break down in the notes. 70 new/renewing members. Harry proposed to accept the new members, Alison seconded the motion, the motion was carried unanimously.

Treasurers report, Current status of our bank accounts and term deposit accounts are as listed:

- NAB (ASN operating account as of 29/07/2019) \$161,679
- BOS – \$13,061
- BTA – \$18,353
- Term deposit \$21,357 [3 months 1.6%]
- Term deposit \$233,292 [12 months 2%]

In summary ASFB continues to be in good financial standing.

- Main Income for 18-19 includes
- Membership \$18,546 (increase from previous years)
- Sponsorship \$18,000
- Bank Interest \$6,901
- Conference distributions \$4,519
- Main expenses for 18-19 include (discus)
- Prizes/awards \$30,124 (increase from previous years)

Charles asked to make sure that the audit is available for the AGM.

Harry also noted that income from FRDC for 2019 will occur to support 2019 Canberra conference as contract has been issued.

Action: Lenore to ensure that the audit is ready and available for the AGM.

No surprises in income and main expenses were prizes and awards.

Gretchen proposed a motion to accept the Treasurer's Report, Harry seconded the motion, the motion was carried unanimously.

5. *Student & State Representative reports (All)*

SA Gretchen said there are a few ASFB members helping with the World Fishery Congress conference program.

QLD. Mischa preconference get-together is planned for September.

Tas. Sean reported. Aust rec foundation holding the national conference, recreational fishing science and communication, if

anyone is interested please look at their website. Andrew asked is this something that should go on ASFB social media. Sean agreed (and this has occurred)

NSW. Charles reported on Keller Kopf's behalf (from email), news from NSW that would be helpful to notify members of on Facebook and Twitter:

1)The first international Freshwater Macroecology symposium will be held in Albury in December 2020, and there will be a special issue in Global Ecology and Biogeography. If ASFB members are interested in participating, then please visit <https://macroecologylife.wpcomstaging.com/> or contact Keller Kopf (rkopf@csu.edu.au).

2)CSU is offering a new Graduate Certificate in Fish Conservation and Management (available on campus or online) in 2020. <https://www.csu.edu.au/handbook/handbook20/courses/GraduateCertificateinFishConservationandManagement.html>

Action: Andrew to put these links up on the facebook page and twitter.

ACT. Matt working hard on the conference.

No reports from other State/Territories or students

6. *Newsletter (Harry)*

Kathy thanked everyone for the efforts in getting material in to the last newsletter in the right format

Kathy has spoken to Harry about standing down as newsletter editor, if someone is suitable, she is happy to stand down immediately otherwise Kathy is happy to continue for the next edition (usually a larger one).

Harry thanked Kathy for an amazing job and would encourage her to stay to complete the next newsletter.

Kathy thought the editor should be funded to attend the annual conference, even if it is only registration

Action: Agenda item for next meeting to discuss funding for Newsletter Editor to attend the annual conference.

Leanne suggested that we try to find someone asap so that they can work with Kathy on the next newsletter, so they get the benefit of Kathy's experience. Kathy would be happy to that.

Brendan suggested that ASFB seek 2 people for the role. Kathy saw that this idea could work, where one person can do the sourcing of stories and information, and one person can do the layout. Kathy thought it was worth considering.

Harry suggested the senior Executive members and Kathy, discuss how to move forward.

Brendan thought it would be useful if something about the newsletter editor position should be put up on the website as soon as possible.

Action: Harry to write up a short EOI advert for Newsletter the website. Harry to also review previous role statement and seek input from other senior exec for discussion.

Action: Andrew to put out a call on social media to link to the website

Action: Harry to make sure the Newsletter Editor position is mentioned at conference and AGM. This is an important role and need to ensure it is given priority

7. Communications (Andrew)

Andrew presented his communication report. We had high engagement on social media in recent months, gaining 792 'likes' on Facebook (up to 7,479 likes in total). In March, Andrew launched an online survey for our social media followers, to collect data about who is following us and what sort of content they'd like to see. We received 45 responses, most of them positive about our social media content.

Gretchen asked a question about a comment in the ASFB social media survey, where the ASFB was accused of advocacy with certain posts. Andrew responded that he wasn't sure which posts in particular would have prompted this comment, although he has posted reputable news stories about potentially divisive topics, such as marine parks and the effects of feral horses on freshwater fish. Harry said that Andrew is very careful with his posts and always remains impartial. Gretchen agreed.

Alison noted the large number of non-ASFB members as likes (62.2% of survey respondents). She asked if we could do more promotions that we can do to put on FB about the annual conference – a tempter for people to actually attend the conference, and potentially become a member. Andrew asked would getting the plenary speakers, or other speakers, to film a 2-minute video as a good way to publicise the conference. Gretchen suggested that posting the graphical abstracts on social media might help peak interest. Gretchen qualified her suggestion by pointing out that permission may be required to use the graphical abstracts. Andrew said there will be a bunch of videos coming from the ASFB video competition.

Action: Andrew to consider options for additional FB posts promoting the conference pre and during it. This has been done recently.

8. World Fisheries Congress 2020 update (Harry)

The Congress is currently tracking well, the focus for the next couple of months is to decide on confirming plenary speakers, Welcome to Country format, dignitaries to invite, if a

Professional MC for Congress Dinner is required and finalising the Call for Abstracts

Smaller groups have met to discuss potential workshops
An International Program Committee meeting was recently held to discuss possible plenary speakers, workshops and a journal for key papers.

There will be 8 plenaries in the program, with 1 of these being the International Fisheries Award Winner. The committee are hoping to fill 1-3 of these spaces with high-profile speakers. The ASFB Award Winner will have a concurrent session spot, not a plenary speaker session.

Andrew asked if the K. Radway winner will be presenting. Harry responded yes, though at this stage it will most likely be in a concurrent session.

Action: Harry and Alison to discuss with WFS organisers issues relating to ASFB presence at the conference. E.g. AGM and award presentation slot, time for award talks.

9. IPFC Auckland 2021 update (Gerry)

Gerry updated the Council, the conference organisation is going ahead slowly.

Harry asked what the timelines were for meetings. Gerry said he expects the meetings to ramp up later this year.

Alison reminded us that both 2020 and 2021 conferences will be a challenge to retain ASFB presence and noted that we need to be co-badged as much as we can. Gerry said everything he is doing has IPFC/ASFB.

Brendan asked how do we maintain a very good relationship with ASN, given that they will not be working with ASFB over the next 2 years, how do we keep the good relationship going. Harry pointed out that ASN were in full knowledge and had the opportunity to bid for both conferences. Through the re-signing of our current contract there was good rapport and both parties expect same to continue after 2021 conference when next ASFB_ASN contract is renewed.

10. Canberra 2019 update (Chris)

Chris Fulton provided an update on the Canberra conference. Registrations, funding and logistics are all falling into place for our annual conference in Canberra (14-17 October). With less than 10 weeks to go, we currently have 201 registered attendees and 188 presentations. The workshops are nearly full, with 3 places left in the Writing, 1 in the Graphical Abstracts, 4 in the Fish Art, and 5 spaces in the Animal Ethics workshops being held on Monday 14 October at the National Library.

We have secured over \$40k in event sponsorship to date. Now all the workshops and social events (Monday - welcome reception, Tuesday - pub quiz night, Wednesday - Big

Messages public forum, Thursday - conference dinner) are locked in, we're focused on drafting a detailed daily schedule for the special sessions and developing advertising for the Big Messages public forum. On the latter, we'd really appreciate help from the Executive to invite key people to the public forum - if you have contacts in high places, please share the advertising material that will be circulating via ASFB social and e-mails to members towards the end of August. We have room for 300 people to attend, so we'd like to make it a big night! There are still some spots available for the conference dinner at the spectacular National Gallery of Australia - people who were unable to tick that box during registration due to financial restrictions of their employer can contact ASN to buy a separate conference dinner ticket. I think we will be a carbon neutral event, and we are working hard on minimizing plastics, as well we are offsetting some of the travel to the conference by supporting green fleet.

Harry said that WFC would like a small speaking slot to promote the WFC at the 2019 ASFB conference. This has created some programming difficulty for Chris as it is such a large conference. Some discussion around how to fit this late request in to a very tight schedule. WFC slide will be on high rotation throughout the conference. The Executive Council discussed and agreed that a slot on morning of last few minutes should be aimed for, and Chris agreed stating that he needs to finalise the program before committing.

Action: Chris to confirm slot time and advise WFC organisers and Harry and Alison.

Charles asked when the Executive Council meeting might be held prior to the AGM. Chris did not know if it would be possible at this juncture to find room in the schedule. Brendan suggested a breakfast Executive Council meeting. It was decided that the Executive Council would have a teleconference in the week prior to the start of the conference.

Action: Charles to send out a poll of the Executive Council members to ascertain the best time to have an Executive Council meeting in the week prior to the conference.

Action: To discuss option of an Executive Council breakfast one morning of the conference, at next meeting – this can be raised at Executive Council meeting prior to conference

11. Constitutional requirements for the Canberra AGM (Charles)

Charles found that, in speaking with a representative of Consumer Affairs Victoria, amendments could be made to our Constitution as long as the process fulfilled both the Society's rules and the Associations Incorporation Reform Act 2012 (the Act). The Act requires that: Each member of the association who is entitled to vote at general meetings must be given at least 21 days' notice of the proposed resolution, in the manner provided by the rules of the association. Unfortunately, this was

not done prior to last year's AGM and consequently the changes voted on last year have not been included in our constitution. Taking the opportunity to bring our constitution in line with the Act by including a couple of minor amendments requires the membership to be notified of these additional changes 21 days prior to the 2019 AGM in Canberra. It is also opportune to inform members what occurred with trying to update the Constitution after last year's AGM

Action: Harry and Charles to notify the membership of the proposed rule changes, at least 21 days prior to the AGM.

12. Other Business

Charles presented a proposal by Keller, asking if the Executive Council would consider funding a student travel and registration award (up to \$1500) for an ASFB member to attend the Freshwater Macroecology symposium in 2020, and 1 scholarship for an ASFB member to enroll in the Fish Conservation and Management grad. cert (up to \$6000) also in 2020.

These proposals were discussed by the Executive Council. It was agreed that the conference would only appeal to a small number of the membership and is not associated with ASFB in any real way. For example, the theme has not been explored as a special topic or sub-committee within the Society. There is also the issue of setting a precedent for other similar events – ASFB cannot support all aquatic workshops in Australia – ASFB needs to ensure its our own future as priority. We can promote the course on our FB page, and flyers at our upcoming conference if requested.

Similarly, ASFB can assist in promoting the new CDU course on FB, the Society cannot advocate for any one course of another, nor provide funding for it specifically.

Chris Fulton pointed out that AFS have a professional development program and universities have their own funding for advertising. Ebbs asked who runs these professional development programs, Chris responded that the AFS did (usually at their annual conferences).

Alison asked if this strategy should be discussed that Harry is considering should be dealt with by FoS. Harry said yes probably.

Action: Harry to draft a letter to Keller on behalf of the outlining our response and justification.

Action: Terms of reference/guidelines for funding for other conferences and events to be considered more fully in future of Society meetings.

13. Next meeting

October 2019

Minutes ASFB Executive Council Meeting

Thursday 10th of October 2019, 1100-1300 AEDT

Teleconference

Executive Council members: Harry Balcombe, Alison King, Chris Fulton, Lenore Litherland, Charles Todd, Brendan Ebner, Kathy Cure, Andrew Katsis, Matt Beitzel, Nastaran Mazloumi, Joel Williams, Keller Kopf, Mike Hammer, Krystle Keller, Gerry Closs, Malcolm Francis, Leanne Currey-Randall, Mischa Turschwell, Gretchen Grammer, Chris Bice, Sherrie Chambers, Emily Lester, Sean Tracey, Jonah Yick, Scott Raymond, Kylie Hall, Emily Fisher

Apologies:

Brendan Ebner, Kathy Cure, Matt Beitzel, Joel Williams, Mike Hammer, Krystle Keller, Sherrie Chambers, Emily Lester, Sean Tracey, Scott Raymond, Adrian Gleiss

Agenda

1. Welcome / apologies
2. Minutes from previous meeting
3. Actions from previous meeting (Harry)
4. Constitutional re-submission for AGM
5. New members and treasury report (Lenore)
6. Student & State Representative reports (All)
7. Newsletter (Harry/Kathy)
8. Communications (Andrew)
9. World Fisheries Congress 2020 update (Harry)
10. IPFC Auckland 2021 update (Gerry)
11. Canberra 2019 update (Chris)
12. Snowy River EIS (Harry)
13. Other Business
14. Next meeting

Minutes complied by Charles Todd

1. Welcome / apologies

Harry welcomed everyone to the meeting.

2. Minutes from previous meeting

Harry motioned to accept the minutes from the previous meeting and Chris seconded the motion; the motion was carried unanimously.

3. Actions from previous meeting (Harry)

Actions from previous past minutes before last meeting held on 6th of August 2019

Action: Harry to draft purpose and preliminary scope of the Future of the Society committee and develop an EOI to be sent to full membership. Harry has sent out an early draft.

Action: Future of the Society Committee and other Committees, agenda item for next meeting. Ongoing. TOR should include review of financials, strategic investments. That the FOSC has been established previously. New Executive

Council will review revised TOR and then go to an EOI in early 2020 to full membership.

Action: Brendan to put some draft words together for the Awards Committee to review on an international sponsorship package by the end of March. (World Fisheries Congress 2020 update). Not as yet.

Action: Harry to discuss with Steve Beatty to get his input in to this package and Bronwyn Gillanders should be cc'd in all communications around this (World Fisheries Congress 2020 update). To be discussed at the next ed committee. Continuing

Action: 50th anniversary development (Auckland 2021) To be discussed at the first meeting of the next Executive Council.

Action: Send Harry an email to express your interest in attending Science meets Parliament in November (STA). Not done, delayed to be certain that our representatives are definitely free to attend. Resolved, Alison and Lenore will be representing ASFB in November.

Action: Lenore to ensure that the audit is ready and available for the AGM. Completed

Action: Andrew to put these links up on the facebook page and twitter. Completed

Action: Agenda item for next meeting to discuss funding for Newsletter Editor to attend the annual conference. To be discussed with new contract for newsletter editor and discussed with the new Executive Council.

Action: Harry to write up a short EOI advert for Newsletter the website. Harry to also review previous role statement and seek input from other senior exec for discussion. Andrew will disseminate. Completed

Action: Andrew to put out a call on social media to link to the website Done

Action: Harry to make sure the Newsletter Editor position is mentioned at conference and AGM. This is an important role and need to ensure it is given priority. Done

Action: Andrew to consider options for additional FB posts promoting the conference pre and during it. This has been done recently. Andrew has been doing a great job Chris Fulton will update.

Action: Harry and Alison to discuss with WFC organisers issues relating to ASFB presence at the conference. E.g. AGM and award presentation slot, time for award talks. Discussion ongoing confident things will fall out ok.

Action: Chris Fulton to confirm slot time and advise WFC organisers and Harry and Alison. Done

Action: Charles to send out a poll of the Executive Council members to ascertain the best time to have an Executive Council meeting in the week prior to the conference. Done

Action: To discuss option of an Executive Council breakfast one morning of the conference, at next meeting – this can be raised at Executive Council meeting prior to conference. Harry to email everyone with a date.

Action: Harry and Charles to notify the membership of the proposed rule changes, at least 21 days prior to the AGM. Done

Action: Harry to draft a letter to Keller on behalf of the outlining our response and justification. Done

Action: Terms of reference/guidelines for funding for other conferences and events to be considered more fully in future of Society meetings. Discussion point in draft FoS document

4. *Constitutional re-submission for AGM*

Proposed rule changes were sent. Feedback received from one external about gendered language.

Also noted a conflict between one element in the rules and a former proposed rule change regarding online voting. To be left with the next Executive Council and/or FoSC to audit the whole constitution to ensure it captures our need for more inclusive mechanisms for participation.

Noted that Constitution needs periodic review and this should be reviewed by FoSC. For example Chris Fulton said that gendered terms and other barriers to participation should be addressed. Gretchen said the rules need to represent how the society currently operates and also allow it to progress into the future.

5. *New members and treasury report (Lenore)*

Lenore presented the new members report. Current membership is back up to 423 this now includes 116 student members. We have 11 new/renewing members since Last Executive Council meeting in August.

Lenore motioned to accept the new members and Gretchen seconded the motion; the motion was carried unanimously.

Lenore presented the Treasurer's report. Circulated was the balance sheet and the profit and loss statements.

Current status of our bank accounts and term deposit accounts are as listed:

- NAB (ASN operating account as of 7/10/2019) \$148,300
- BOS – \$13,063
- BTA – \$17,854
- Term deposit (KR Allen) \$21,357 [3 months 1.6%, 18/10/19] *
KRA expenses (medals engraving and awardee travel) will be withdrawn at maturity
- Term deposit (Main) \$233,293 [12 months 2%, 21/07/2020]
- ASFB continue to be in good financial standing

Year to date summary

- Main **Income** for 19-20 includes
 - Membership \$4,909
 - Bank Interest \$390
 - Main **expenses** for 19-20 include
 - ASN membership management \$8,020
 - Prizes/awards \$6,893
 - Newsletter \$2,500
 - Annual audit and accountancy \$1,570
 - Subscriptions/memberships \$1,895

Good financial standing. FRDC grant negotiated a one-year extension which helps finance the conference.

Harry motioned to accept Treasurer's report and Leanne seconded the motion; the motion was carried unanimously.

Lenore said that she intended to present last financial years summary financial position, income and expenditure statement, statement of financial position, and the audit report at the AGM and wanted to know if there was anything else that might be reported on.

Chris Fulton asked if Lenore could include a comparison of award expenditure over past few years to present, as promised at 2017 AGM when we moved to a new budget model (e.g. increased ASFB-wide grants such as Threatened fishes).

6. Student & State Representative reports (All)

Harry reminded those who are up for re-election and are standing down can you please ensure that you have a replacement in place

NSW Keller freshwater symposium happening next year and we will start advertising that now. Harry asked how large the conference might be Keller was hopeful to get 40 to 60 speakers.

QLD Harry reported that 8 people turned out for a gathering.

Tas Jonah gave a brief update on the Carp Management Program in Tasmania. Eradication efforts are still on going in Lake Sorell. It has now been 259 days since the last carp was caught in Lake Sorell. Coming into Spring, we are reaching the peak spawning/activity period, which usually results in increased catch rates. It is estimated that there is less than 20 carp remaining in the lake, and with no spawning observed for many years, the end point could be very close.

No other Student & State Representative reports.

Action: Charles to send out the list of retiring Representatives.

7. *Newsletter (Harry/Kathy)*

Harry said recent discussions with Kathy revealed she was happy to finish her role as editor after one final December newsletter. Also very happy to provide guidance to the incoming editor during the intervening period if we get one after conference. Kathy will release a newsletter call and given timing will need great support and effort by ALL state reps to get stories and feedback. She does not have a feature story yet – so please help.

Alison we really do need that replacement Newsletter Editor, we need to find the right person for us. A few names were mentioned for following up with that may be interested in taking on the Newsletter Editor role

8. *Communications (Andrew)*

Andrew provided his Communications report. As of October 9, we have 7,823 'likes' on Facebook, and 2,309 followers on Twitter.

Andrew has seconded numerous people to help him out with ASFB social media during next week's conference, as he is not able to attend himself.

Andrew thanked everyone who put their hand up to help in his absence. Andrew also pointed out his contract is up at the end of this year and is happy to continue.

Action: Andrew to inform the Executive Council whether there is suitable network connectivity in the Galapagos, where he will be conducting fieldwork from mid-January to mid-March 2020; and whether this will interfere with his ASFB role.

9. World Fisheries Congress 2020 update (Harry)

Harry reported that the Congress is currently tracking well, the focus is currently on finalising plenary speakers, there has been a lot of International input (especially from AFS members)

Still some concern about having freshwater and conservation focus – but working on it. Welcome to Country format, and still looking to find the right celebrity as opening plenary speaker.

Expect to have a call for Abstracts by end of month, these will then be sorted into relevant themes by programme committee

Meetings will ramp up after Canberra conference. Alison and Harry to meet with Bronwyn and Gavin in Canberra to discuss ASFB expectations

Hoping to achieve 1500 attendees.

Chris Fulton asked about sponsorship commitments from the ASFB for WFC 2020 with respect to supporting student travel and travel of delegates from neighbouring Indo-Pacific neighbouring nations to event? Harry said that we have not provided anything yet, and anything we fund will be out of ASFB budget at this stage. FRDC is already a major sponsor of the event.

10. IPFC Auckland 2021 update (Gerry)

Gerry reported things are coming together well, organising the conference dinner and accommodation location. Hoping to get the Auckland Museum for the welcome function. Applying for a fee waiver from the museum. At this stage, all the main locations are booked.

Harry asked about potential numbers, Gerry thought somewhere between 300 and 500 attendees. Chris Fulton flagged the need to consider sponsorship funding for the IPFC along similar lines as proposed for WFC2020.

11. Canberra 2019 update (Chris)

Chris Fulton reported that Canberra conference organising committee is on track for a successful ASFB2019 conference in Canberra, with over 240 registered attendees presenting 169 talks and 16 posters. Gender and career diversity in organising committee has translated to gender balance and career diversity in our keynote speakers (50-50) and conference session chairs; we have just two special sessions (out of nine) led by a single-gender group – one of those is female-only and one is male-only.

A late boost in sponsorship (to total of \$66k) allowed us to enhance the catering and social event options (rather than generate a surplus). The pre-conference workshops (to be held on 14 October) are all full, except for a few places left in the writing with quality workshop. The Assistant Minister for

Forestry and Fisheries the Hon Senator Jonathon Duniam will officially open the conference during the Monday night welcome event. We have worked with ASN to develop a new app for this event, which will allow delegates to download and then access (offline) the full program, abstracts and compile a personalised calendar of events (including special sessions, talks, social events using the favourites function). Instructions for the app will be e-mailed to delegates this week.

We still have plenty of capacity for the Big Messages public forum, so please do advertise widely amongst your networks. We're also encouraging everyone to submit a graphical abstract for their presentations (instructions were sent to presenters last week), with prizes (\$500 each) awarded to the best GAs by a student, early career and general member of the ASFB.

Harry thanked Chris Fulton and his team for the putting together the conference.

Chris Bice asked how many graphical abstracts have been submitted. CF only nine at the moment but we are leaving the submission open as long as we can before judging for announcement at dinner.

12. Snowy River EIS (Harry)

We have been contacted by Mark Lintermans re: The Snowy River 2.0 EIS.

It has been released for public comment (all 9000+ pages of it!). There are some significant threatened fish and alien fish issues associated with this project, Mark has flagged the ASFB committees (threatened fish and aliens), wondering about whether those committees could/should make brief submissions highlighting relevant issues in the EIS.

Mark is hoping the executive could consider taking this to the members at the AGM.

Note: ASFB does not traditionally lobby on public issues – there have been exceptions. ASFB did this for the Traveston Dam proposal. The ASFB submission was presented to the ASFB AGM to get member signoff (due to the angst about the society being potentially seen as a lobbyist).

Do we need to do the same for the Snowy (i.e. flag it at the AGM)? We will not have final submissions prepared by then, but Mark could give a thumbnail sketch about the issues in 3-5 minutes and seek member endorsement for putting in a submission. This would entail outlining why we should/could highlight issues and how it was done in 2006 or 2007 when the society provided comment on Traveston dam.

Submissions close on 6 Nov 2019. It will be impossible for Mark and committees to get a full draft letter prepared to take

to the AGM. Hence, not the same level of detail provided to the AGM in 2006.

Harry would like some feedback on what the Executive Council think in general about ASFB lobbying.

Keller thought it is important to consider, however he does know people who have projects on Snowy Hydro. If we were to lobby then this needs to be communicated to the membership and to seek approval and what is proposed. Alison pointed out that is hard to take a position on an issue because of the broad nature of our constituent members, but we can be a conduit for information dissemination. Chris Fulton asked what our role is, maybe it is simply to raise the profile of fishes in the region and that they are high profile and species of concern, or make general comments for the need for decisions to be based on scientific evidence, and that sufficient time must be granted for that to be done before progressing the project. Harry agreed but we would still need to present any submission to the members the Executive Council agreed.

Agreed to allow Mark Lintermans to present the details and potential response to the AGM. Harry will then propose a way forward after Mark's presentation for members to vote on.

13. Other Business

ASFB fish ethics and welfare committee

There has been a proposal from Cullum Brown and colleagues to form a new ASF fish ethics and welfare sub-committee. This is off the back of discussions at a workshop at last years conference. Draft Terms of Reference were circulated just before the meeting are there any issues to consider.

Chris mentioned that some aspects of scope are exclusionary (e.g. "Australia"), which limits its suitability and relevance to our broader membership. Objectives also states guidance to someone, but not exactly who? Also need to include statement that FEWC recommendations need to be endorsed by full Executive Committee before release to membership.

Gretchen suggested geographic restriction feeds through the whole proposal and needs to be rethought.

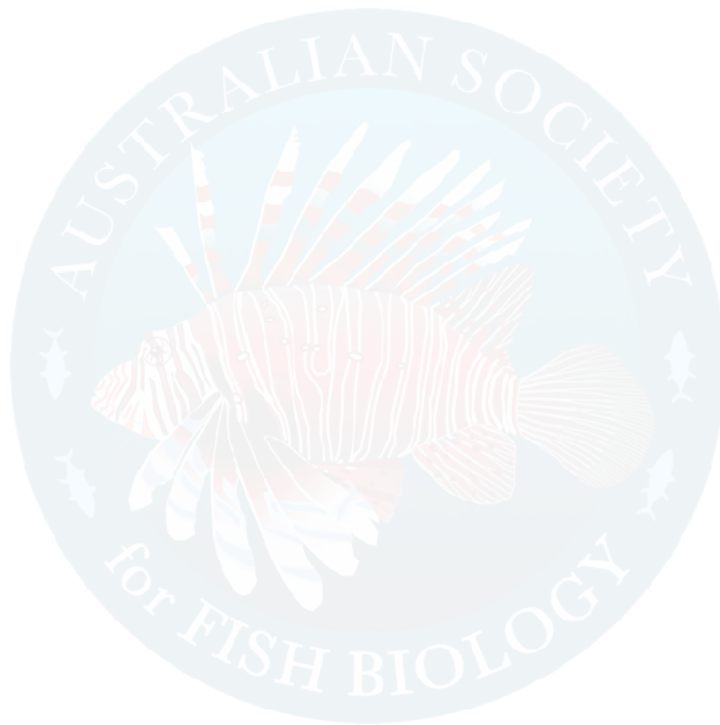
Alison suggested that Cullum seek further assistance from broader member potentially at the AGM and Exec to get the ToR right. The current ToR are not ready in their current form. Also needs a process of getting sign-off of documents from Exec before they are on the ASFB website or branded as being supported by ASFB. Chris Fulton pointed out that it took the fisheries management committee 2 years to get their terms of reference right, and that we have lots of members who site on Ethics committees across Australia and New Zealand. Leanne suggested that further discussion and a broader development of ideas was necessary.

Action: Harry to write to Cullum with general concerns as it is not a proposal that the Executive Council will support at the moment.

The Executive Council noted that this would be Harry's last meeting as President, and Chris's last as Past President. We thanked them for their commitment to serving ASFB.

14. Next meeting

December 2019



Annual General Meeting

Australian Society for Fish Biology, Inc. 2019
Theatre, National Library of Australia, Canberra, ACT
13.30-15.30pm, Wednesday 16th of October, 2019

Draft Minutes compiled by Charles Todd

1. *Welcome and apologies*

Welcome

Harry Balcombe (ASFB President) welcomed everyone to the meeting. Harry welcomed the presence of one of our international visitors, Scott Bonar, the President of the American Fisheries Society. A quorum was achieved with 77 members present.

Apologies

Gary Jackson, Gerry Closs, Malcom Francis, Dianne Bray, Richard Tilzey, Bronwyn Gilanders, Dave Pollard.

2. *2018 AGM Minutes*

Harry declared the minutes of the 2018 AGM (as published in the December 2018 ASFB Newsletter) as being a fair representation of the 2018 Annual General Meeting. Harry Balcombe proposed a motion to accept the 2018 AGM minutes and Karl Moy seconded the motion, the motion was carried unanimously.

3. *Executive Council's Report*

Harry presented the Executive Council Report to the AGM. Harry reported that the Executive Council met 4 times during the past year one more meeting than our Constitution requires.

COMMUNICATIONS

As always, Andrew Katsis has been doing a great job keeping ASFB in the social media spotlight. 2018-19 highlights from ASFB social media include: 7,823 likes on Facebook, an increase of 1,700 since this time last year (and almost twice as many likes as the American Fisheries Society); ASFB has 2,309 followers on Twitter, a gain of 435 since this time last year; at last year's conference, ASFB launched a national competition to crown Australia's favourite fish. There were nearly 1,200 votes received for more than 100 species, and, most importantly, got people talking about fish. The winning species was the leafy seadragon (followed closely by Murray cod).

Finally, Andrew would like to remind ASFB members to send him your new papers and other successes so that he can publicise the work on social media. If you have any photos or videos based on your research, they are always especially popular with our online followers. Contact email: ackatsis@outlook.com. Harry expressed his thanks to Andrew for his ongoing commitment to the Communications Manager role. Harry, pointed out to members that Andrew was in the absolute final stages of submitting his PhD and was unable to attend the conference this year. However, he had organised numerous people to replace him who were taking photos, tweeting and posting on Facebook. Harry wished Andrew good luck with finishing his PhD.

NEWSLETTER

Kathy Cure has done a great job really positive feedback again this year with the December and June newsletter. However, Kathy will be retiring after December. Harry expressed his thanks to Kathy for an outstanding job and looks forward to a new newsletter editor pointing out that it is great opportunity for

an early career researcher or post graduate with skills in publishing. Kathy is happy to teach the editor the ropes.

CODE OF CONDUCT

We continue to strive to improve and learn from past events and following earlier issues and a harassment issue from last year's dinner (from a non-ASFB member), ASFB finalised a code of conduct for our events and annual conference. This was implemented through registration at this conference and has been received well. Thank you to all those who contributed to its development.

FUTURE OF SOCIETY COMMITTEE

As an Executive Council we note that serving our members needs to not only involve the efficient day to day running of the Society but also continue to evolve and meet the future needs as imposed by an ever-changing social background, economic and scientific evolution. The Executive Council, (particularly the senior Executive Council) as volunteers juggling careers, families and lives, are focussed on running the society and would benefit from having access to advice from an external committee focussed especially on emerging needs for the Society.

The FOSC can provide an alternative view for the Society's future, as well delve deeper into important issues, unencumbered by day to day functions of the society.

Topics for FOSC will explore: a full review of the society aims, committees and sub-committees, awards and constitution to ensure full gender diversity and equity issues are reflective of community standards.

1, ASFB now has a code of conduct for communications, for the annual meeting and other official events. The Executive Council, through the FOSC, will now consider a wider-arching code of conduct that covers not only these but also professional expectations of our members in general – as a statement of our commitment to being a supportive, safe, welcoming and nurturing society.

2. Reworking society business and the constitution to give greater access to members to partake in decision making – it is essential to ensure that all members are able to partake in voting for society positions – there are many members who are not able to attend conferences regularly and they must be afforded the opportunity to vote in absentia (e.g. online, skype or other opportunities).

3, There may also be issues confronting the Executive Council from time to time where direct feedback from members would benefit the Executive Council's decision-making such as the odd occasion where the Society may be requested to advocate for a given issue. This is an issue that comes up reasonably regularly, the FOSC would be well placed to examine the role ASFB could /should/should not play – some guidelines on how we deal with this would be useful

4. There is also an opportunity to re-visit the budget. Chris Fulton presented a 5 year plan for our budget at the 2017 AGM. Some things have changed especially our return on investment – we get virtually nothing from our fixed-term deposits. This is clearly an area of our business that needs thought – such as do we need financial advice from a professional?

Draft FOSC makeup:

We propose that the makeup of the FOSC should contain, at a minimum, senior Executive Council members, i.e. Treasurer and Secretary and either a former President, Vice-President or President and have an innate understanding of budgetary and policy implications for advice provided.

The Chair should be an ASFB member ideally a current or former President or senior Executive Council member who has knowledge of how the Executive Council runs. It is suggested this should not be the current President to allay concerns over conflict of interests and workload.

It should also include ECR representatives, mid-late career members and be gender-balanced.

Chair – experienced ASFB member who has innate knowledge of ASFB Executive Council running
2-3 Senior executive members (from Pres, VP, Past Pres, Secretary, Treasurer)
2-3 mid-late career members – could be past presidents or general members
2-3 student members – could be on executive but not necessary

Suggest the FOSC starts with the senior members then an EOI sent out to full society and the senior members choose.

ACTION: Alison will take this forward with the next Executive Council in 2020.

Constitutional change

Harry pointed out that our Constitution requires that (Rule 39) “Notices of motion to amend the Constitution are required to be lodged with the Secretary of the Society 6 months prior to the general meeting at which the motion is to be presented”.

Harry had notified the ASFB Secretary (Charles Todd) that the 2018 AGM would consider changes to the Constitution, 6 months prior to the AGM as the Society’s rules dictate. The amendments were presented to the AGM for Rules 2, 23 and 25. Voting was conducted accordingly, and changes passed. Our rules do not require the notification of the membership of the proposed changes to the rules prior to the AGM.

In speaking with a representative of Consumer Affairs Victoria, Charles Todd was informed that amendments could be made to our Constitution as long as the process fulfilled both the Society's rules and the Associations Incorporation Reform Act 2012 (the Act). The Act requires that: “Each member of the association who is entitled to vote at general meetings must be given at least 21 days' notice of the proposed resolution, in the manner provided by the rules of the association”.

As members were not notified prior to the 2018 AGM of the proposed changes the Society was not able to get the new rules approved by the Registrar of Consumer Affairs Victoria. As a result, the 2018 changes will have to be voted on again, with notification having been sent to all members 21 days prior to today’s AGM. Harry proposed to conduct the vote through two special resolutions.

The intention of Resolution 1 is not to re-prosecute the case made at last year’s AGM, but to ratify the vote from last year, however this time in accordance with the requirements of Consumer Affairs Victoria and the Act under which our Constitution and operation of our Society are defined.

Harry pointed out that one element was changed from the 2018 constitutional presentation that had been agreed upon. Rule 25.7 was to have included the clause “(which may include options such as online voting or proxies)”, however Rule 20.2 states that “All votes shall be given personally; members will not be able to vote by proxy”. To avoid any conflict within the Constitution the addition to Rule 25.7 was removed and will be left to the next Executive Council to resolve.

Kat Cheshire asked if it were possible to have gendered expressions removed in any future constitutional changes. Harry agreed it was a good idea.

Resolution 1: to accept all the changes to our Constitution that were voted on by the membership at last year’s AGM (with removal of the clause added to Rule 25.7).

Harry proposed a motion, as a special resolution, Resolution 1 as outlined in his communique with members sent on the 24th of September, Chris Fulton seconded the motion, the motion was carried unanimously.

The intention of Resolution 2 is to make some minor changes to our Constitution to keep it up to date with the practise of running the Society. Also, to modify how changes to the Constitution are made in keeping with the Act.

Resolution 2: to accept the proposed changes to update our Constitution to reflect how the Society operates and bring rule changes in line with the Act.

Harry proposed a motion, as a special resolution, Resolution 2 as outlined in his communique with members sent on the 24th of September, Cullum Brown seconded the proposal, the motion was carried unanimously.

4. *Science and Technology Australia Report*

Harry informed members that STA launched the STEM Ambassadors and Superstars of STEM II programs. The next round of STEM Ambassadors will open for application in late November and Superstars of STEM III will open in July 2020. STA also launched stemwomen.org.au with the Australian Academy of Science, CSIRO, Australian Science Media Centre and the Department of Industry Innovation & Science.

STEM Women is an online directory of women in Australia working in science, technology, engineering and mathematics (STEM). STEM Women aims to promote gender equity in STEM by showcasing the breadth of scientific talent in Australia, enabling a diverse range of women to be offered exciting opportunities to progress their careers and personal capabilities.

STA prepared a number of submissions to help advise government policy, including submissions to the Australian Human Rights Commission on Sexual harassment in the STEM Workforce, to the Australian Research Council on the Implementation of the National Science and Research Priorities under the National Competitive Grants Program & a submission regarding Performance-Based Funding for the Commonwealth Grant Scheme.

Successfully developed in consultation with members the 'Solve it with Science' - awareness campaign and resources for members. These resources were specially designed to help members make the most out of the Federal Election, and to empower their members, staff or stakeholders to advocate for a strong future for science and technology in Australia.

STA also formed an Equity, Diversity & Inclusion Committee, which seeks to enhance the EDI efforts of STA member organisation and also have produced templated resources for members to easily integrate EDI policies into their organisations.

STA have also published the first biennial Review of Australian STEM Associations and Societies, which captures some essential ingredients for success.

STA also assisted in the holding of the inaugural Canadian Science meets Parliament event.

STA continues to advocate on behalf of the STEM sector on issues affecting the sector and meeting with Parliamentarians, policymakers and over stakeholders on the hill to ensure our members voices are heard loud and clear.

Specifically of interest to ASFB would be the commending of the two expert scientific reports investigating three mass fish kills in Menindee, NSW, and calling for bipartisan support and action on their recommendations for the Murray Darling River System.

5. *World Council of Fisheries Societies Report*

Harry presented the World Council of Fisheries Societies report. WCFS Executive (including Past President, President, VPs, and Executive Officer) have continued to hold Skype meetings (3-4 times per year). WCFS now officially has tax free status and finances are independent of AFS. Informal meeting of member societies was held at AFS in Reno, Nevada. International Fisheries Science Prize announced at AFS – award and plenary will be made at WFC in Adelaide. Call for EOI for 2024 World Fisheries Congress is now open. Looking at recruiting an intern (or similar) to do some of the exec assistant work (free up Doug Austen whose currently been doing this role but is increasingly busy with AFS business.

Key themes of WFC Adelaide 2020 will be: Sustainable fisheries; Fish and aquatic ecosystems; Fisheries and society; and the Future of fish and fisheries. There will be 9 plenary speakers, including the International Fisheries Science Prize winner Prof. Katsumi Tsukamoto, University of Tokyo speaking on the biology, ecology and conservation of freshwater eels. Other plenaries to be announced.

Timelines for open call: Abstract submission etc., Open October 2019 and Close 31 January 2020; Abstract review February – April 2020; Authors notified of acceptance – May 2020; Author registration by early bird closing date; Registrations open February 2020; Early bird registration closes end June 2020

6. *Treasurer's Report*

Lenore Litherland presented an ASFB membership update, noting that as of June 30th 2019 ASFB had 411 members, this includes 112 student members. Between 2016 and 2019 membership ranged from 377 to 438 so the current membership status is sitting within this range.

Membership breakdown:

Category	#
Life membership	13
Ordinary membership - 1 year	103
Ordinary membership - 3 year	170
Retired membership - 1 year	12
Student membership - 1 year	112
Institutional newsletter subscription	1
Total	411

Jeff Leis asked if anyone has done any modelling of age classes of membership, to what might be a sustainable level of grants/awards over the next few years. Harry thought it was a good idea and said the Executive Council would look at it.

ACTION for Exec: Age membership breakdown over recent years. For input into FOOSC.

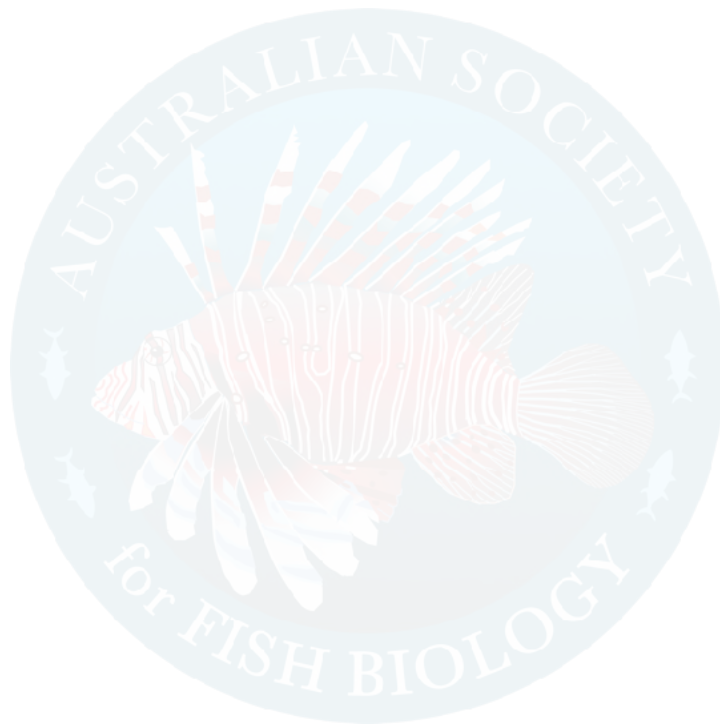
Lenore Litherland presented the Treasurer's report on the financial position of the Society to the AGM. Lenore reported that the Society operating activities ran at a slight loss for the financial year to June 30 2019 of \$5,386. The Societies key income for the financial year included Membership fees and sponsorship which were up from 2018. Key items of expenditure included prizes and awards which were almost 50% higher compared with 2018. Otherwise the Society is in a sound financial position. The Income and Expenditure Statement, the Statement of Financial Position and the Statement by Members of the Committee were presented to the meeting.

Lenore reported that an independent audit of the Societies 2019 financial reports has been completed by Woottons. A copy of the audit letter (dated 19th August 2019) was presented. The audit found the financial statements for the Society are drawn up to fairly represent:

A.The financial position of the entity as at 30th June 2019 and the entity for the financial year of 2018-2019

B.Other matters required by law and in accordance with applicable accounting standards

Lenore noted the full report will be included in the December Newsletter.



Australian Society for Fish Biology Inc

ABN 51 446 372 430

**Income and Expenditure Statement
for the year ended 30th June 2019**

	2019	2018
	\$	\$
Income		
Conference Distribution	\$4,519	-\$6,360
Interest Received	\$6,901	\$6,165
Membership Fees	\$18,546	\$15,900
Miscellaneous	\$45	\$0
Sponsorship	\$18,000	\$12,000
Total Income	<u>\$48,011</u>	<u>\$27,705</u>
Expenses		
Accounting Fees	\$720	\$1,032
Administration Costs	\$7,620	\$8,720
Auditors Remuneration	\$800	\$1,800
Bank Charges	\$595	\$322
Conferences - Committee	\$536	\$2,538
Filing Fees	\$58	\$57
Consultants	\$4,500	\$6,000
Functions	\$304	\$435
Meeting Costs - Committee	\$2,075	\$1,447
Miscellaneous Expenses	\$164	\$0
Postage	\$0	\$32
Prizes and Awards	\$30,124	\$17,020
Printing and Publications	\$3,750	\$3,785
Speaker Costs	\$301	\$0
Sponsorship	\$0	\$5,000
Subscriptions	\$1,850	\$2,436
Travel and Accommodation	\$0	\$569
Website	\$0	\$27
Total Expenses	<u>\$53,398</u>	<u>\$51,221</u>
Net Surplus/(deficit) from operating activities	<u>-\$5,386</u>	<u>-\$23,516</u>
Total changes in equity of the Association	<u>-\$5,386</u>	<u>-\$23,516</u>
Opening retained profits	\$329,721	\$353,237
Net surplus/(deficit) attributable to the Association	-\$5,386	-\$23,516
Closing retained profits	<u>\$324,334</u>	<u>\$329,721</u>

This statement is to be read in conjunction with the notes to the financial statements

Australian Society for Fish Biology Inc

ABN 51 446 372 430

Statement of Financial Position

As at 30th June 2019

	Note	2019 \$	2018 \$
Current Assets			
Cash Assets			
Cash at Bank	2	\$133,585	\$124,433
Investment Accounts	4	\$267,705	\$267,650
		<u>\$401,290</u>	<u>\$392,083</u>
Receivables			
Trade Debtors	3	\$0	\$0
		<u>\$0</u>	<u>\$0</u>
Other Current Assets			
Refundable Deposits	5	\$3,000	\$33,907
		<u>\$3,000</u>	<u>\$33,907</u>
Current Tax Assets			
GST Refund due	5	\$0	\$0
Total Current Assets		<u>\$404,290</u>	<u>\$425,990</u>
Total Assets		\$404,290	\$425,990
Payables			
Event Accrual	6	\$72,033	\$87,545
		<u>\$72,033</u>	<u>\$87,545</u>
Current Tax Liabilities			
GST Payable due	6	\$7,923	\$8,725
		<u>\$7,923</u>	<u>\$8,725</u>
Total Current Liabilities		<u>\$79,956</u>	<u>\$96,270</u>
Net Assets		<u>\$324,334</u>	<u>\$329,721</u>
Members' Funds			
Accumulated surplus(deficit)	7	\$324,334	\$329,721
Total Members' Funds		<u>\$324,334</u>	<u>\$329,721</u>

This statement is to be read in conjunction with the notes to the financial statements

Directors:

Alex MacLeod BEc FCA
Darren Forsyth BBus CA

Consultant:

Susan L Milton BEc FCA

REPORT OF INDEPENDENT AUDITOR

Scope

We have audited the financial statements comprising the Profit & Loss Statement and Balance Sheet of the Australian Society for Fish Biology for the period ended 30th June, 2019. The Trustee is responsible for the preparation and presentation of the accounts and the information they contain. We have performed an audit of these accounts in order to express an opinion on them.

Our audit has been planned and performed in accordance with Australian Auditing Standards to provide a reasonable level of assurance as to whether the accounts are free of material misstatement.

Our procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the accounts, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion whether, in all material respects, the accounts are fairly presented.

The audit opinion expressed in this report has been formed on the above basis.

Audit Opinion

In our opinion, the financial statements of the Australian Society for Fish Biology are drawn up so as to present fairly:

- (1) the financial position of the entity as at 30th June, 2019 and the performance of the entity for the period ended on that date.
- (2) other matters required by law and in accordance with applicable accounting standards.

Dated at Mornington, 19 August 2019.



Alex MacLeod
WOOTTONS

2018-2019 EOFY comparison – Bank Accounts

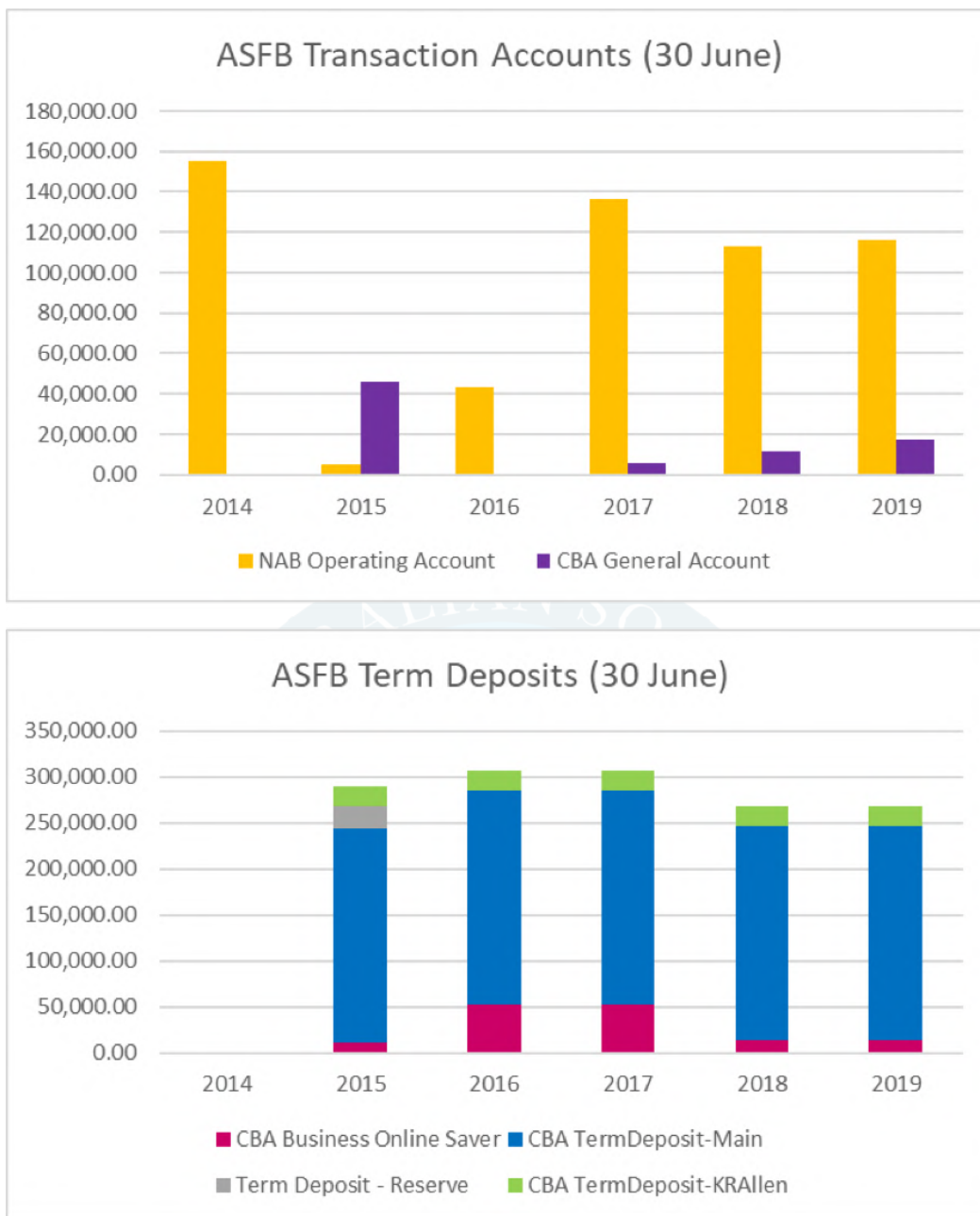


Figure 1. These graphs plots the Societies banking assets. Top: Societies 2 transaction accounts for 2014 to 2019 as of 30th June each year; Bottom: Societies 4 savings accounts (including the term deposits) for 2014 to 2019 as of 30th June each year. Accounts are relatively stable, but worth noting that interest levels are not wonderful at present.

2018-2019 EOFY comparison – Income vs Expenditure

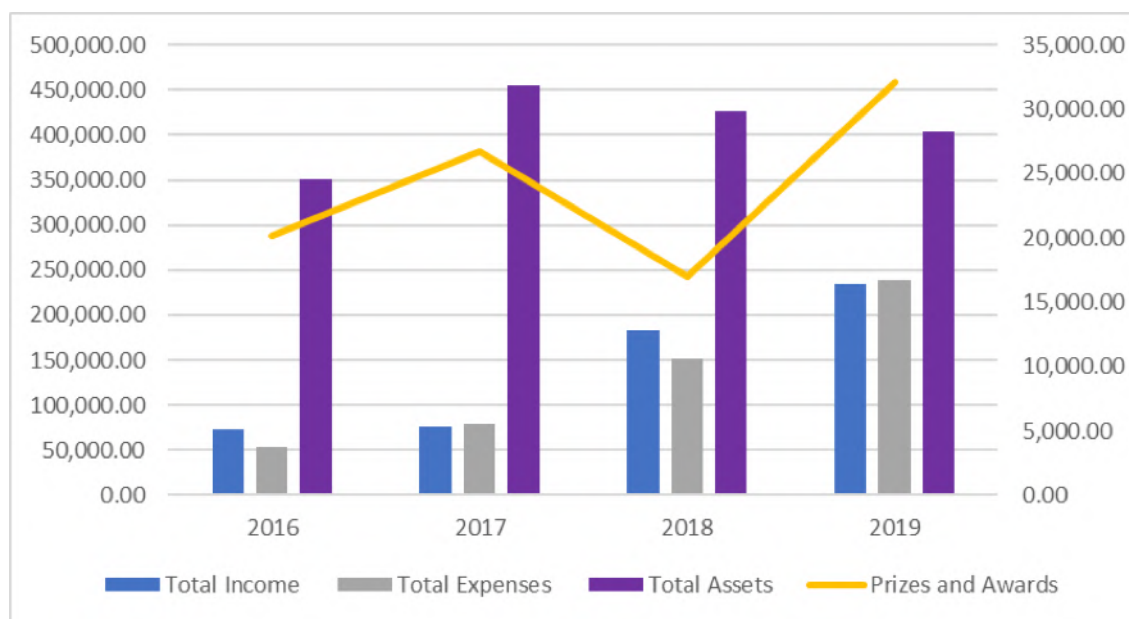


Figure 2. The graph highlights income vs expenditure and total assets as of June 30 for 2016 to 2019. Also plotted for general interest is the societies spending on prizes and awards, which is tracking upwards. This is related to the additional awards and grants (including the new threatened species grant) offered by the Society.

Tony Miskiewicz asked if there was going to be an increase in travel awards for next year. Harry said that yes the Executive Council will consider it, however ASFB often has an under spend on travel awards.

Lenore proposed a motion to accept the Treasurer's Report, John Koehn seconded the proposal, the motion was carried unanimously.

Harry thanked Lenore for her invaluable contribution to the running of the Society for the past 2 years. The membership gave Lenore a generous round of applause.

7. *Committee Reports*

a **EDUCATION COMMITTEE REPORT**

Steve Beatty presented the Education Committee Report.

- The Education Committee will hold its annual meeting during the Canberra meeting (18/10/2019) to discuss awards and other activities.
- Thanks again to the other members of the Committee: Stacy Bierwagen, Lachlan Fetterplace, Katie Ryan, Leanne Curry, John Morrongiello, Brendan Ebner, Jason Thiem.
- Thanks to Chris Hallett for his contribution as he has stepped down from the Committee.
- Thanks also to Sherrie Chambers and Emily Lester (student reps) for excellent work towards student engagement including the Quiz Night held last Tuesday

Awards

- Thanks again go to the FRDC for funding the awards and supporting the future of fisheries research in Australia.

- Awards to be announced at the Dinner tomorrow night.
- This year we had 32 entries for the Gilbert Whitley and John Lake awards
- I thank the Whitley and Lake judges Karina Hall, Jane Williamson, Jason Thiem, Michael Hammer, Bonnie Holmes, Stacy Bierwagen, Brendan Ebner
- Student Research Awards: Michael Hall and Barry Jonassen research award applications (winner and runner-up prizes totaling \$6000): as usual, the quality of research applications was very high and congratulations to all students that entered on their excellent research.
- John Glover Travel Bursaries supported 22 students to attend the Canberra conference. Thanks again to FRDC.
- SCiSC competition first time ECR category was available and online voting has continued during the conference, the entries are of an exceptional standard.

World Fisheries Congress

The ASFB is playing an active role in organising the World Fisheries Congress in Adelaide. We are leading the Education and Training component and are very keen to hear ideas for workshops or innovative initiatives for the meeting. The meeting promises to be a supercharged version of ASFB with the allure of international delegates that will create excellent networking opportunities. Student registration is also heavily subsidized so we encourage all members to not miss the meeting.

WFC Education and Training Committee Initiatives include:

- Student Mentoring Program
- Awards for supporting delegate travel from developing countries
- Speed talk competition
- Online video competition.

Please make sure to check out the website <https://wfc2020.com.au/>

ASFB Facebook, Twitter, Newsletter

Andrew Katsis continues to do a wonderful job. The ASFB and broader society; particularly relating to student awards and events. (>7800 likes up from >3100 likes as of October 2016, Twitter has >2300 Followers). Please continue to follow and contribute to ASFB social media.

- I will be stepping down as Chair of the ASFB Education Committee. Thanks to all that have contributed over my time. I am pleased to announce Stacy Bierwagen and Jason Thiem will be the new Co-Chairs of the ASFB Education Committee. I will continue to Co-Chair the WFC Education and Training Committee with Stacey and Jason.

Harry asked the members to give Steve a round of applause for his great work on the Education Committee for the past 6 (4?) years, his work has been tireless and has done a great job. There was generous applause from the membership for Steve.

b ALIEN FISHES COMMITTEE REPORT

Ben Broadhurst presented the Alien Fishes Committee report.

We met on Tuesday 15th October 2019 at this years annual conference. There was a great turnout with 10 committee members in attendance, plus a number of others who were interested in alien fish news. WE received news from each of the jurisdictions with the following highlights:

- Jamie Allnut (National Carp Control Program Coordinator) provided an update on the NCCP. Jamie reported that the science was largely complete, and it was now progressing on to decision making by relevant authorities about whether the release would go ahead (though this process may take some time)

- There has been some range expansions of Tilapia species in QLD and WA.
- Carp control continues in Tasmania. They are down to their last 20 individuals in Lake Sorell, and these are aging and are in poor condition.
- NIWA are leading two major fish tracking acoustic arrays that are being installed in Lakes Rotoiti (for brown bullhead catfish) and lake Rototoa (for perch and tench)

Driven by Co-chair Bonnie Holmes, the committee was hoping to present the proposed changes to the Alien Fishes Committee terms of reference to the AGM at this year's conference, but fell short of time and will present these to the general membership at next year's meeting in Adelaide. These are mostly small changes, but better reflect the evolution of the committee to its current format.

Mark Lintermans presented his case the committee to garner support for an ASFB submission on the Snowy 2.0 EIS which would be signed by the ASFB president and the chairs of the Alien Fishes Committee and the Threatened Fishes Committee. Mark presented his case briefly outlining the issues and suggested that ASFB make a submission outlining these issues and offering its expertise to find solutions. The Alien Fishes Committee voted and it was unanimous that the committee supported the motion. It must be noted that 1 member of the committee abstained from voting because of a conflict of interest.

Ben asked what about ideas at the next conference, Gavin Begg just said submit any ideas

The members thanked Ben with a round of applause.

c **THREATENED SPECIES COMMITTEE REPORT**

Compiled by Michael Hammer (Convenor) & Karl Moy (Vice-convenor) and presented by Karl Moy.

The Threatened Species Committee met on Monday, 14th October 4:30PM – 5:30PM, Meeting Room Level 4, National Library of Australia.

Current Committee

Convenor: Michael Hammer
 Vice-convenor: Karl Moy
 Australian Capital Territory: Mark Lintermans & Hugh Allen
 New South Wales: Luke Pearce & Amy Tims
 Northern Territory: Michael Hammer & Krystle Keller
 Queensland: Steve Brooks & Brendan Ebner
 South Australia: Nick Whiterod & Lauren Veale
 Tasmania: Rob Freeman & Tom Barnes
 Victoria: Tarmo Raadik & Dianne Bray
 Western Australia: David Morgan
 Federal Government: vacant
 New Zealand: Bruno David & Nick Ling

Minutes

1. Attendees:

State representatives: Michael Hammer (NT/Convenor), Karl Moy (ACT/Vice-convenor), Brendan Ebner (QLD), Amy (NSW), Hugh Allen (ACT), Luke Pearce (NSW), Mark Lintermans (ACT).

Apologies: Lauren Brown (formerly Vale; SA), Nick Whiterod (SA), Krystle Keller (NT), Steven Brooks (QLD), Tom Barnes (TAS), Tarmo Raadik (VIC), Dianne Bray (VIC) and David Morgan (WA).

Visitors in attendance: 12.

2. Nominations for state representatives/vice convenor: no nominations received.

3. New listing nominations received: no nominations received (but see point 6).

4. A reminder was made for jurisdiction roundup reports for the December newsletter, including threatened species profiles.

5. Update on the Threatened Fishes Grant:

The inaugural ASFB threatened fishes grant was awarded on 14 March 2019 with Hugh Allan, Institute for Applied Ecology, University of Canberra, as the successful applicant for the project “Guardians of the Galaxias: understanding the ecology of a threatened galaxiid and a novel approach to conservation assessment.”

Hugh provided an update on the project:

- Plans to improve species security and resilience.
- Will use drones and LIDAR to map barriers and suitable habitats for translocation sites.
- Activity will now ramp up in spring (habitat inaccessible in winter).
- Also provided a general update on the status of the critically endangered Tintangara Galaxias (good recruitment, range remains highly restricted).

6. IUCN Redlist of Australian Fishes Summary:

Mark Lintermans provided a summary of a workshop held to assess the conservation status of all Australian freshwater fishes under the IUCN Redlist which was held in Melbourne during February 2019. Some 242 species were assessed of which 90 (37%) were considered threatened including 10 recognised but undescribed species. All jurisdictions were represented but the highest number of threatened species were recorded in southern Australia. The list will be published on the IUCN website in early December.

This list can help to inform EPBC listings and argues for an urgent update to the Australian Freshwater Fishes Action Plan.

The TFC will also work towards adding species reviewed in the IUCN review to its threatened fishes list that uses the same IUCN criteria (now that the workshop has finished!).

This work also compliments the Red Hot Redlist which identified the 22 Australian freshwater fish species most likely to go extinct in the next 20 years.

There is a similar workshop now in the planning for New Guinea freshwater fishes (see Michael Hammer).

7. Snowy Hydro 2.0

- Environmental impact statement has been recently released on the new project.

- Mark outlined the proposal and potential impacts to threatened fishes (Tantangara Galaxias, Macquarie Perch, and also Murray Crayfish) and highlighted shortfalls in their discussion of these impacts and level of details on other mitigation measures.
- He contended that the ASFB, through the TFC and the AFC is an appropriate avenue through which to raise important issues onto the public record, to offer our expertise towards these matters (not as a formal submission), and to generally help inform members.
- Other TFC members expressed that this approach could help consideration of other water transfer schemes in Australia that receive less attention.
- The committee voted unanimously in support, however 4 states were not represented and a NSW rep abstained from voting.
- Submissions close on the 6th of November.

8. Craig Moritz, representing the Academy of Sciences, National Committee for Ecology, Evolution and Conservation – attended the meeting to discuss raising the profile of threatened fish species and conservation action planning.

9. Threatened Species Workshop, ASFB conference Melbourne 2018, “tools and support for saving species”: UPDATE proceedings from the well-attended workshop published in 2018 newsletter.

The members thanked Karl with a round of applause.

d FISHERIES MANAGEMENT COMMITTEE REPORT

Fiona Hill and Tom Roberts presented the Fisheries Management Committee report.

Fisheries Management Committee progress in 2018/19.

Following endorsement of the formation of the Fisheries Management Committee at the last AGM a number of steps have been taken to consolidate the formation and progress items of interest to fisheries managers around the country.

The Terms of Reference and work plan for the committee were finalised and endorsed by the Australian Fisheries Management Forum at their March 2019 meeting.

This provides high level support for the committee for fisheries managers to participate in the committee and attend key events like the ASFB conference.

The Committee has established a presence on the ASFB website and provided updates for newsletters. A database of fisheries managers has been established and maintained for the provision of information on committee activities and projects to the broader fisheries management community.

The committee has been trailing ongoing communication portals including Slack and Trello to enable information to be stored and shared amongst the group with the ultimate aim of these sights being made available to all fisheries managers in the future.

The committee has met seven (7) times to progress key items from its work plan, culminating in a resource allocation workshop on Monday which had representatives from the majority of jurisdictions. The committee also supported the programming for the conference and are thankful to the organising committee for aligning fisheries management sessions to be closer to the workshop to allow more fisheries managers to attend and participate in sessions.

In accordance with the terms of reference, changes to a jurisdictional representative are nominated by the outgoing representative. The executive team will elect the new Chair and Deputy Chair at its next meeting.

Consistent with the terms of reference the membership of the committee will be renewed following the ASFB conference and the incoming committee will continue to engage with ASFB and the broader fisheries management community to continue to progress with making the committee relevant to its key aims in its terms of reference.

The members thanked Fiona Hill and Tom Roberts with a round of applause.

8. 2018 Annual Conference Report – Melbourne, Victoria, wrap up

John Koehn reported on the outcomes from the 2018 conference held in Melbourne. The conference was attended by about 250 delegates and included a range of themes including: climate change, fisheries, carp control and communications. Highlights included the range of keynote speakers and the well-attended public forum on climate change, fish and fisheries that provided an update from the 2010 workshop and forum on the same theme. The conference made a small financial profit.

The members thanked John with a round of applause.

9. 2019 Annual Conference, Canberra, ACT

Chris Fulton reported that everything is on track for a successful ASFB2019 conference here in Canberra, with over 230 registered attendees coming from every state and territory in Australia, New Zealand, Europe, South Africa, the USA and Fiji making 185 presentations.

Hard work went in to ensuring gender and career diversity in the conference organising committee, which translated to gender and career diversity in our keynote speakers and conference session chairs; there have been just two special sessions (out of nine) led by a single-gender group – one of those was female-only and one was male-only.

A late boost in our conference events sponsorship, up to \$66k in total, has allowed the organising committee to enhance the catering and social event options, rather than generate a surplus. The budget projection has a total expenditure of around \$197,000, which should place us at either a balanced position or in slight deficit, which should be easily covered by the remainder of funds from the 2019 FRDC funding, once the student travel and presentation awards are covered.

The pre-conference workshops were almost all full and a raging success from the feedback received to date. The Assistant Minister for Forestry and Fisheries the Hon Senator Jonathon Duniham officially opened the conference during our Monday night welcome event in the Library Foyer.

The morning plenary session led by six outstanding experts in their various fields of graphical and written communication provided the ASFB 2019 delegation with some excellent ideas for elevating how they tell their fish & fisheries stories with their fellow scientists and managers and the general public.

The fish pub quiz last night was also a huge success, thanks in a very large part to Emily Lester and Rhiannon Jones.

There is some capacity for the Big Messages public forum tonight, so please do advertise widely amongst your networks. A huge thank you to Katie Ryan for driving that forum design and program.

Finally, there has been a wonderful response to the graphical abstract competition, with 21 presenters submitting some outstanding GAs for the judges to consider in the student, early career and general member categories.

I wish to end by thanking the team on the organising committee: Katie, Ben, Elise, Rachael, David Ellis, Matt, Nathan, Mae, Robert, Emily, Rhiannon, Paula, Harry, Ebb, Steve Beatty and Andrew Katsis, and the outstanding team at ASN - Ruby, Chad and Kasia. Please stand up. Everyone - please thank these wonderful people.

The members gave the organising team a rousing round of applause and then the members thanked Chris with a round of applause.

10. 2021 IPFC Conference Auckland, NZ.

Harry informed the membership that things are coming together well, with organising the conference dinner and accommodation location. Hoping to get the Auckland Museum for the welcome function. Applying for a fee waiver from the museum. At this stage, all the main locations are booked. It was thought that there would be somewhere between 300 and 500 attendees.

Jeff Leis on the oversight for the IPC series, choice for the venue for 2025, Bleaker Awards are also given. Asked for people to think about potential nominees. If you have any questions please ask Jeff. Harry asked what the timing of the awards nominations was, Jeff replied they open a little later this year.

Alison King pointed out that the 2021 conference will be the 50th anniversary of ASFB, and is seeking any ideas for celebrating the Society, if you have any ideas please speak to Alison or the organising committee.

11. Elections

Harry reported that, under the changes to the Society's rules adopted earlier in the meeting, Alison King, by virtue of having held the office of Vice-President and being the current Vice-president, automatically becomes the new President. Harry welcomed Alison King as the next President of the Society.

Single nominations were received for the other offices of the Society, and in accordance with the rules of the Society.

Vice-President: Harry proposed a motion to accept Gretchen Grammar as Vice-President, Chris Fulton seconded the proposal, the motion was carried unanimously.

Treasurer: Chris Fulton proposed a motion to accept Lenore Litherland as Treasurer, Karl Moy seconded the proposal, the motion was carried unanimously

Secretary: Brendan Ebner proposed a motion to accept Charles Todd as Secretary, Ben Broadhurst seconded the proposal, the motion was carried unanimously

Harry thanked the retiring members for their contribution to the Executive Council and ASFB as a whole.

The following nominations were received for the available State and Student Representative positions. All nominees were elected unopposed and unanimously.

State	Nominee	Proposer	Second
ACT	Hugh Allen	Matt Bietzel	Ben Broadhurst
NSW	Katherine Cheshire	Jason Thiem	Chris Fulton
NT	Michael Hammer	Kylie Hall	Matt Bietzel
NZ	Gerry Closs	Tony Miskiewicz	Mark Lintermans
QLD	Leanne Currey-Randall	Brendan Ebner	Stacy Bierwagen

SA	Jasmin Martino	Chris Bice	Tony Fowler
Student	Kynan Hartog-Burnett	Tony Miskiewicz	Tiffany Sih
TAS	Sean Tracey	Charles Todd	Stacy Bierwagen
VIC	James Shelley	Scott Raymond	Martin Gomon
WA	Alissa Tate	Kim Smith	Steve Beatty

12. *Other Business*

12a) Snowy River Scheme upgrade

Harry introduced the Society's general stance on advocating for any particular issues, but noted that there have been occasions in our history where it has occurred and invited Mark Lintermans to discuss the Snowy River Scheme upgrade. Mark briefed the AGM on the potential impacts for fish of the Snowy 2.0 pumped hydro scheme, for which the Main Works EIS is currently out for public comment. The major concerns centre on the potential transfer of alien fish species (Redfin perch, Climbing galaxias, Goldfish and Eastern gambusia) from Talbingo Reservoir to Tantangara Reservoir. Also of concern is the potential for the transfer of Epizootic Haematopoietic Necrosis Virus (EHNV) from the Tumut system to the upper Murrumbidgee should Redfin perch establish in Tantangara. There are three threatened species of concern: Murray crayfish (in Talbingo) and Macquarie perch and Stocky galaxias in the upper Murrumbidgee. Disposal of excavated tunnel spoil in Talbingo has likely impacts on water quality and fringing macrophyte beds, with Climbing galaxias and Redfin perch/EHNV likely to seriously impact Stocky galaxias and Macquarie perch respectively. Noting that the ASFB is not a lobby group, but cognisant of the history of the Society expressing concerns in 2006 over the potential impacts of the proposed Traveston Dam in Queensland, Mark proposed that the ASFB prepare a submission highlighting the potential impacts of Snowy 2.0 and offering the Society's expertise around the likely impacts and potential mitigation measures.

Kat Cheshire was supportive of the society responding as long as the letter was structured to report on the facts of the issues, but would need to steer clear of judgement and opinion re government policy to ensure that it did not compromise ASFB members who are government employees. NSW DPI Fisheries staff should not be involved in the Letter re Snowy 2.0 - this includes its drafting, or providing comment on drafts due to a conflict of interest based on our involvement as a contracted research body but also being directly involved in the EIS evaluation as a Department.

In responding to a question from the floor on whether it would be possible to look at the submission beforehand, Mark Lintermans stated that he didn't know how we could do that in any timely manner.

Chris Fulton stated that every member doesn't have to agree. It is by a majority of members.

Kat Cheshire suggested that the tone of the letter needs to stay away from the being a lobbyist, as there are code of conduct issues relating to how Government employees engage with lobby groups.

Mark Lintermans agreed and pointed out the lack of information on designs etc., any response from ASFB should stick to the facts.

Fiona Hill federal positions also cannot comment on government policy.

Mark Lintermans SH2.0 is not government policy, it is just asking for comment on the EIS at this stage.

Gina Newton EHN virus is a significant issue and more needs to be made of this.

Mark Lintermans argued that we don't have the basic science to have faith in the decision making process.

Brendan Ebner made the point that we have the expertise, we are just advertising that we have that expertise.

Mark Lintermans argued that we are highlighting the issues and our expertise.

Jeff Lies pointed out that the government has asked for comment, so we should provide it, we're not questioning policy.

Scott Raymond stated if we don't do it, who will do it?

Mark Lintermans agreed and it is not an easy task, they are trying to get approval by exhaustion. He doubted the process will come back to individuals who comment including us, the ASFB.

Harry proposed a motion to accept Mark Lintermans proposal Chris Fulton seconded the proposal, the motion was carried by majority vote.

ACTION: Senior Executive Council members will consider a draft submission letter provided by the Threatened fishes and Alien fishes committees. Senior Executive Council members will review, endorse and submit on behalf of ASFB.

Scott Raymond asked if members can be informed about how to make a personal submission.

ACTION: Harry will have the link put on the website by Andrew Katsis.

12b) Exploring Climate Change options with AFS

Scott Bonar (AFS President) spoke about the effects of climate change on aquatic ecosystems in the US. He pointed out that there is an opportunity for our Society's to come together to argue the need for action on climate change. Scott would like to explore a joint statement or joint proposal that becomes a powerful statement on the urgent need to act on climate change. Harry pointed out to the meeting that we, being ASF and ASFB, are not ready to make a statement yet, that this is exploratory and is seeking feedback from members as to whether to proceed or not.

Stacy Bierwagen wanted to know who would we be targeting

Scott Bonar that is one of the things to explore

Gina Newton pointed out that this was a perfect opportunity with WFC next year.

Maggie Watson: Look at other society's and what they are doing, ESA publishing topical items and pushes these ideas. Aus Coral Reef Society

John Koehn: 2010 we had major symposium on climate change, which was published. When seeking themes for the 2018 conference, it was suggested to take on climate change again. This led to a public forum on climate change again. The point being the Society has made statements in this space.

Chris Fulton: There is already consensus science for any statement to draw on.

Patricia Kailola commented that it appears to her that the Society does not want to be a lobby group, but that there is also want to speak out on certain things. Patricia suggested creating a company (no shareholders) that can act as a lobby group. Patricia further stated that an independent lobby group could to take away any potential conflicts that members face.

Harry proposed a motion to work with the AFS Executive to develop a climate change joint statement, Jeff Lies seconded the proposal the motion was carried unanimously.

ACTION: The next Executive Council will take this forward in 2020.

13. Next AGM and close

Next AGM will be held in Adelaide during 11th – 15th of October 2020.

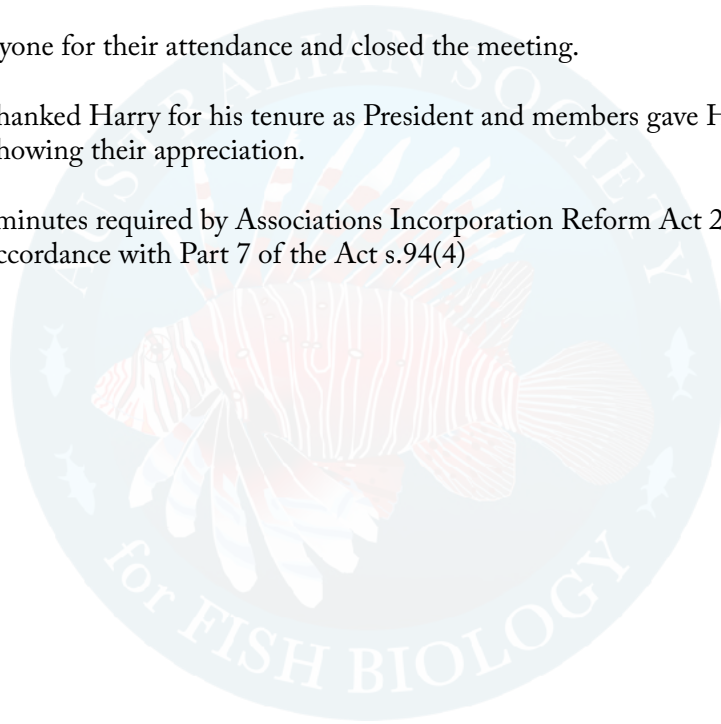
Harry pointed out to the members at the AGM that our Constitution requires members to vote on the location of the next conference, even though it has been planned well in advance. Harry proposed a motion for Adelaide to be the location for the 2020 Conference and AGM, John Koehn seconded the motion, the motion was carried unanimously.

Finally Harry thanked all members for their overwhelming support, it has been a great honour to be have been President. Particular thanks to the Executive Council for all their hard work and especially my senior Executive Council members: Chris Fulton as Past President, and Lenore, Charles and Alison who has balanced moving states and holding down two jobs - all the best Alison.

Harry thanked everyone for their attendance and closed the meeting.

Mark Lintermans thanked Harry for his tenure as President and members gave Harry a very generous round of applause showing their appreciation.

Attachment to the minutes required by Associations Incorporation Reform Act 2012 No. 20 of 2012 in accordance with Part 7 of the Act s.94(4)



Schedule 1
Regulation 15
Form 1

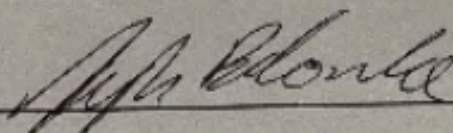
Associations Incorporation Reform Act 2012

Sections 94 (2)(b), 97 (2)(b) and 100 (2)(b)

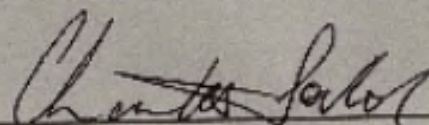
**Annual statements give a true and fair view of financial performance and position
of incorporated association**

We Harry Balcombe and CHARLES TODD being members of the
committee of the AUSTRALIAN SOCIETY FOR FISH BIAA certify that -

"The statements attached to this certificate give a true and fair view of the financial
performance and position of the above named association during and at the end of
the financial year of the association ending 2019."

Signed: 

Date: 16/10/19

Signed: 

Date: 16/10/19

ASFB Committee Reports

ALIEN FISHES COMMITTEE

Compiled by Ben Broadhurst

At the 2019 annual meeting, the Alien Fishes Committee (AFC) voted to support a submission from the ASFB on the Snowy 2.0 EIS. The submission which highlighted concerns around the EIS and an offer of ASFB's expertise to provide input around solutions was drafted by Mark Lintermans then revised by both the AFC, the threatened fishes committee and the executive committee.



Above Photographic records of Siamese Fighting Fish from the Adelaide River floodplain as the first major pest species established in the Northern Territory (aquarium photo: Nathan Litjens, field images Michael Hammer, MAGNT).

Northern Territory

By Mike Hammer

Fighting Fish in the Northern Territory

The results of recent efforts to document the first serious pest fish introduction to the Top End, an aquarium fish the Siamese Fighting

Fish (*Betta splendens*), was published as a collaborative paper with NT Fisheries and the Parks and Wildlife Commission NT in the journal *Biological Invasions*. This paper included a large review of all fish introductions in the Northern Territory, drawing heavily on museum collection records and specimens. A popular media story followed the release of the paper, helping to reinforce the 'Don't Dump Your Fish' message. Read the news [here](#).

Top Right

Checking and repairing barrier net in winter involves breaking through sheets of ice in order to lift the net out of the water for inspection!

Bottom right A frosty, winter morning is spent inspecting barrier nets in preparation for the upcoming 2019/20 carp season.



Hammer M P, Skarlatos Simoes M N, Needham E W, Wilson D N and Barton M A, 2019, Establishment of Siamese Fighting Fish on the Adelaide River floodplain: the first serious invasive fish in the Northern Territory, Australia. *Biological Invasions* 21: 2269–2279.

Tasmania

Written and compiled by Jonah Yick, Fisheries Management Branch, Inland Fisheries Service

Carp Management Program

With the arrival of spring, the Carp Management Program (CMP) is actively preparing for the upcoming carp season in Lake Sorell. By mid-September 2019, all 14 kilometres of barrier net which blocks access to the wetlands was checked and repaired, and the installation of the big fyke nets was also completed. These fyke nets are placed in locations where carp are known to enter the marshes, in an attempt to seek warm water and spawning habitat. The big fyke nets are an indicator of when the carp move inshore, allowing gill nets to be moved into areas where the likelihood of catching fish is highest. Gill



nets were also installed behind the barrier nets in early October, as a secondary defence against any carp which are able to breach the barrier net.

October brought with it some warm weather periods, and as a result the gill netting effort intensified. 33 fishing trammel gill nets totalling 3772 metres were set around the lake, with structure and habitat continuing to be a priority. Most nets were set around the shallow regions of the lake in response to rising water temperatures and lake levels during this quarter. Nets were set at right angles to the shoreline to target fish moving around the margins of the lake. Some nets were also set in deeper water

Left JGC carp in captivity hold promise for delivery of a viral control program



over the rocky reefs where carp have historically been known to favour. Unfortunately, the warm weather was unable to be sustained, and as a result of a few cold snaps, the water temperature dropped back down to around 10°C. Despite there being a total of 23,850 x 100 m net hours of effort being put in so far this season, there has been no sign of any carp. It has now been 276 days since the last carp was caught from Lake Sorell, and for the first time in the history of the CMP (initial incursion detected in 1995), not a single carp was caught in October. It is estimated that there are less than twenty fish now remaining in Lake Sorell.

Hopefully as the season continues to progress, the warmer temperatures should become more frequent, which could result in the final fish getting caught in the nets or traps.

Further support required for sterile carp

Following the completion of a recent IMAS PhD project on Jelly-like gonad condition (JGC) carp, in collaboration with the Tasmanian Inland Fisheries Service, the remaining live JGC carp are currently being

kept in captivity in a secure facility. The focus now will be on communicating publications associated with the work.

These JGC carp hold promise as a valuable resource for developing sex-specific markers, developing risk-reduced Judas carp (as was the case in Tasmania) and potentially as vectors for delivering a viral control program. Conceivably, the CyHV3 infected JGC carp when released into population will infect wild fish. Should they (infected JGC carp) develop resistance, they will be less likely to transmit the resistance to next generations, given their near sterile condition.

Time is running out to secure support and funding from mainland states/territories to propagate and translocate the strain to the mainland where the technique will be of most value. The Tasmanian Inland Fisheries Service does not have the capacity to maintain these fish to isolate a sex-specific marker. The latter could facilitate development of genetic control options.

Please contact Jawahar Patil for further details:
jawahar.patil@utas.edu.au

Trojan to Rescue: Genetic Solution for Devilish Fish

The invasive pest Eastern Gambusia (*Gambusia holbrooki*) is widespread throughout Australia and extremely difficult to eradicate. The Tasmanian population is restricted to the Tamar Estuary and a joint Inland Fisheries Service and University of Tasmania project has been developing Trojan Chromosome, a genetic solution for this devilish fish. This does not involve genetic modification or cause mass killing. Rather, it works by skewing population to a single-sex over successive generations, leading to its extinction.

Thus far, researchers have validated ZZ/WZ sex chromosome using progeny tests and karyomorphology, confirming female skewness as the target strategy. Trojan fish are being produced using hormonal sex-reversal and their fitness systematically assessed. In parallel, a rapid genetic sex screening assay has been developed and is aiding scale up production of Trojan fish. Along with established incursion biomass estimates (based on daily-age structure and catch-data) the assay can monitor Trojan eradication performance. A recent achievement is an ability to instantly sex neonates using morphology recognition algorithm, empowering field data collection. Genetic testing of QLD, ACT, VIC and SA populations reveal broad suitability of the developed Trojan technology, samples from NSW and WA are being tested. A pond trial is being proposed to demonstrate field efficacy.

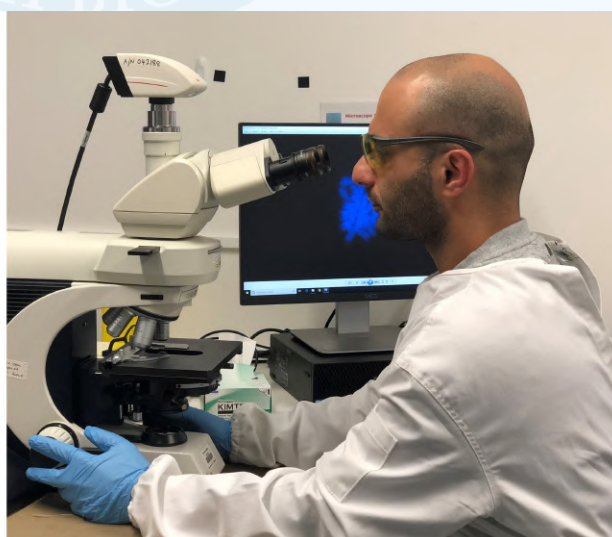
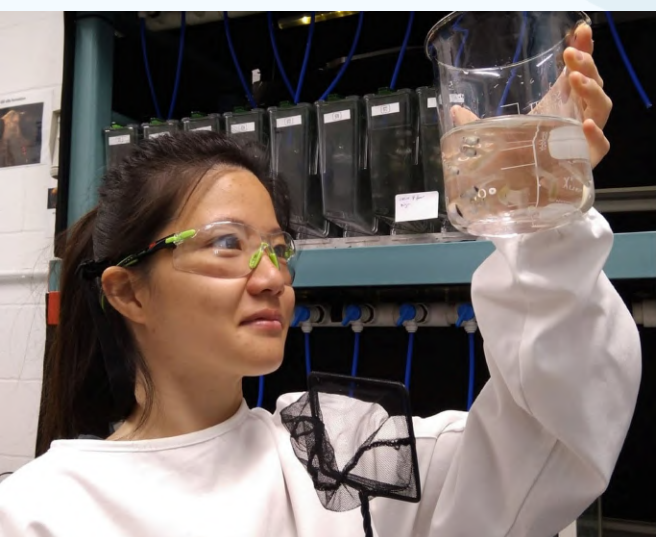
Dr. Jawahar Patil and Dr. Kwan Tzu Nin presented these outcomes at the ASFB 2019 conference, Canberra. Collaborative discussions to progress the technology are being held with partner organisations.

Please contact Jawahar Patil for further details: jawahar.patil@utas.edu.au

Queensland

By Ebb

Tobias Bickel, Brendan Ebner (Ebb), Michael Hammer, Bonnie Holmes, Mariah Millington and David Morgan, Trent Power have been busily preparing information for a scoping report on the matter of incursion pathways from the freshwater aquarium trade as it relates to biosecurity in tropical Australia. The report is for the Department of Agriculture and should be completed before the year is out. As the number of incursions of aquarium plants, fish and invertebrates climbs in tropical Australia, it is a reminder of the challenges of biosecurity in society and aquatic ecosystems. The group has been encouraged by the assistance received from a number of researchers and managers at relatively short notice, including a number of past and current ASFB members that work in the tropical context. Individuals interested in furthering collaborations on aquarium trade related incursions and their prevention should feel free to contact Dr Ebner (brendan.ebner@csiro.au).



Left Hyunji Ki, Gabby (left) and Ehsan Mousavi (right) are Master degree and student PhD that are investigating karyomorphology and age structure of *Gambusia holbrooki* respectively.

Australian Capital Territory

Written by Matt Beitzel

In early July the ACT Government became aware of a dam on public land within the Cotter River Catchment that contained Redfin Perch. Redfin are listed as prohibited in the ACT and are not known to occur within the Cotter Dam Catchment. This catchment is also contains a large population of Macquarie Perch which are at risk from Redfin and Epizootic Haematopoietic Necrosis Virus (EHNV) which Redfin are known to harbor. An Incident Management Team was set up and surveillance confirmed that this was the only location of the species in the catchment. Eradication and decontamination was seen as feasible to deal with both the pest species and any potential for EHNV. The treatment of the dam with Rotenone resulting in the elimination of 250

Redfin. Once the rotenone neutralised the dam was then drained and limed to decontaminate any potential EHNV. Finally the dam was decommissioned and site rehabilitation undertaken so that the dam could no longer support redfin populations.

Below Rotenone being applied to eradicate a redfin incursion in the ACT



ASFB THREATENED FISHES COMMITTEE REPORT – 2019

Compiled by Michael Hammer & Karl Moy

Threatened Species Committee

The Threatened Fishes Committee (TFC) is a long established and active part of the ASFB with committee representation across Australian states and territories and New Zealand; representatives are listed below. The TFC co-ordinates a national independent list of the Conservation Status of Australian Fishes and represents an excellent platform for scientists, managers and students to discuss threatened fish issues and work collaboratively in the conservation space and share knowledge and experiences. The TFC actively promotes threatened fishes through the ASFB newsletter and social media. ASFB members, especially students, are always welcome to attend meetings and are encouraged to become involved with the committee. The committee tends to meet once a year during the Annual Conference of the society, and the meeting is open for all to attend. For further details, ideas, questions or suggestions, please contact your state representative or anyone listed below.

The TFC held its annual face to face meeting at the Canberra conference and was well attended. We also awarded our inaugural Threatened Fishes Grant in March, with project details and an update below (and see threatened species profile). Many members of the TFC have also been actively involved in national reviews of the conservation status of Australian freshwater fishes.

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ASFB Threatened Fishes Grant - inaugural winner

The inaugural ASFB threatened fishes grant was awarded on 14 March 2019 with Hugh Allan, Institute for Applied Ecology, University of Canberra, as the successful applicant for the project "Guardians of the Galaxias: understanding the ecology of a threatened galaxiid and a novel approach to conservation assessment."

Hugh provided an update on the project presented at the annual TFC meeting:

- Provided a general update on the status of the critically endangered Stocky Galaxias (good recruitment, range remains highly restricted).
- The project plans to improve species security and resilience.
- Will use drones and LIDAR to map barriers and suitable habitats for translocation sites.
- Activity will now ramp up in spring (habitat inaccessible in winter).

The TFC is long-established committee with an active contribution to the society. The TFC identified a need to encourage greater participation

in conservation and to support on-ground action through a grant that was supported at last year's AGM and developed by the TFC with review of the Executive. Key details of the Grant include:

- a. Grant value \$5,000 AUD.
- b. Small interventions or studies, 1 year duration.
- c. Species needs to be on the ASFB list (or new nomination).
- d. Students encouraged but not restricted to students, must be ASFB members.
- e. Reporting via newsletter and annual conference.
- f. [Full conditions, process and application details on the website.](#)
- g. Keep an eye out for the next round opening in 2020.

NEWS SNIPPETS

National

Compiled by Mark Lintermans

IUCN Red List assessment

In Feb 2019 the first national IUCN Red List assessment for Australian freshwater fish was conducted. Organized by Mark Lintermans at the University of Canberra and hosted by Monash University, 38 fish experts gathered for 5 days to assess 242 freshwater fish taxa. The Freshwater Biodiversity Unit, Global Species Programme, IUCN (International Union for Conservation of Nature) with support from the Toyota Motor Corporation coordinated and funded the assessment. A total of 90 taxa were assessed as threatened (extinct, critically endangered, endangered or vulnerable), with another 16 taxa considered near threatened and 2 data deficient. 50+ fish assessed under the process as threatened are not listed under the EPBC Act. A major threat to 84/90 IUCN threatened fish was alien fish species (both translocated native and exotic) The formal Red List assessments will be published in early December 2019 of the IUCN Red List website: <https://www.iucnredlist.org/>

Meeting with Threatened Species Commissioner

Mark Lintermans met with the Threatened species Commissioner Dr Sally Box in early November 2019 to discuss whether the 5 -year

Commonwealth Threatened Species Strategy (TSS) released in 2015 was going to be renewed and how threatened freshwater fish might be included in future priorities. Currently there are 20 priority Mammals, 20 birds and 30 plants listed, but no fish. Discussions were positive and whilst there is no Commonwealth Government commitment to a new TSS, Mark is hopeful that fish can be included in a future strategy.

Red Hot Red List

A 2018 workshop by the ASFB and Threatened Species Hub identified 22 freshwater fish taxa that are considered likely to go extinct in the next ~20 years without further interventions. Following incorporation of some information from the IUCN Red List assessments mentioned above, a manuscript is expected to be submitted before the end of 2019 which outlines, the taxa, threats, and future policy and management actions required to save these taxa. Stay tuned!

Snowy 2.0 EIS released for public comment

In September 2019 the Snowy 2.0 Main works Environmental Impact statement (EIS) was released for public submissions, which closed on November 6 2019. The proposal is for a pumped hydro scheme between Talbingo and Tantangara reservoirs with construction of a 27 km tunnel between these two reservoirs. At >9400 pages, (without the primary research reports commissioned by Snowy 2.0) the EIS was a hefty tome. Mark Lintermans addressed the ASFB Threatened Fishes Committee, the ASFB Alien Fishes Committee, and the ASFB AGM in Canberra in October to highlight fish issues relevant to both threatened and alien species. The AGM endorsed the Society preparing a submission that highlighted the fish issues and to offer ASFB expertise should Snowy 2.0 wish to discuss further.

Victoria

Prepared by Tarmo Raadik

Extinct Fish Sighting Back From the Dead

An extremely rare fish thought to be extinct has been reportedly spotted for the first time in over two decades during a lake recovery project in regional Victoria. Two Southern Purple Spotted



Left One of the Southern Purple-spotted Gudgeon rediscovered in Victoria (image via Minister Dan Andrews)

Gudgeon (*Mogurnda adspersa*) are believed to have been identified during fish population surveys at Third Reedy Lake, Kerang. If confirmed, this would be the only remaining population of the species in Victoria after it was declared extinct in 1998 under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).

The two fish were spotted on October 29 by crews engaged by the Connections Project to restore Third Reedy Lake to its original state as a deep, freshwater marsh. The project involves relocating native fish from the lake to more suitable habitats in nearby waterways.

Works stopped as soon as the fish were discovered and the lake draw down process has been temporarily halted until the sighting is confirmed through DNA testing. The fish were safely returned after photos and a small sample from a fin were taken for further analysis, with the test results expected to determine their origin within coming weeks.

If confirmed, the Andrews Labor Government will work with Water Corporations, Catchment Management Authorities, Victorian Fisheries

Authority, environmental consultants, fish experts and the community to develop an appropriate strategy to protect and recover this rare species.

The Third Reedy Lake project is part of the \$2 billion Connections Project - Australia's largest irrigation modernisation project which includes restoring lakes previously used within the irrigation system to a more natural condition.

Conservation work is also underway for this species in the SA and NSW sections of the Murray-Darling Basin.

South Australia

Prepared by Nick Whiterod and Lauren Brown (Aquasave-NGT)

Yarra Pygmy Perch gone from the Murray-Darling Basin

A targeted survey late last year failed to detect Yarra Pygmy Perch in the Murray-Darling Basin. The survey involved tri-replicate sampling of 32 sites where the species previously occurred, revealed

Right A Yarra
Pygmy Perch
from the MDB in
2000; photo M.
Hammer



a very high probability of extirpation (99.5%) signalling the first freshwater fish extinction from the Basin. Broad acknowledgement of this loss of the species is required as is a long-term recovery plan, which will now be reliant on the remaining captive fish.

Updated status of key small-bodied threatened species in the southern Murray-Darling Basin

To coincide with the Tri-State Murray NRM Regional Alliance workshop, a report detailed the present status of six most threatened small-bodied fish species in the southern Murray-Darling Basin. The report, authored by experts from the southern states, paints a bleak picture with few (if any in the case of Yarra Pygmy Perch) known or backup populations for any of the six species. The report represents a useful resource as we look at strategies to recovery these species. A promotion video was also produced (<https://youtu.be/8xnMtq7-oHQ>).

Churchill Fellowship to explore reintroduction strategies relevant to South Australian threatened aquatic species

State Threatened Species rep Dr Nick Whiterod recently returned from overseas travel as part of the Richard Rischbieth Churchill Fellowship awarded through The Winston Churchill Memorial Trust

(www.churchilltrust.com.au). The focus of the Fellowship was to explore world-best practice for the translocation of aquatic species. In 66 days, Nick met with over 50 experts across 20 city and towns over five countries (Costa Rica, US, Britain, Ireland and Sweden). Highlights included participating IUCN Conservation Translocation Specialist training in Costa Rica, visiting varied production facilities for Rio Grande Silvery Minnow and learning about the recovery of Oregon Chub, which represents the first freshwater fish to be de-listed from the US Threatened Species List, thanks to the tireless work of Brian Bangs and colleagues. It was also fantastic to meet with Brian Zimmerman and visit the UK's first freshwater fish dedicated aquarium (at Whipsnade Zoo). The findings of the Fellowship will be summarised in an upcoming report and will assist future conservation for aquatic species.

The simplification and decline of fish communities in Mosquito Creek

Monitoring earlier in the year enabled reassessment of the status of fish communities in the Mosquito Creek Catchment, an important outlying stream habitat in the Southeast South Australia and Southwest Victoria. The catchment once supported a diverse fish community including ecological specialists River Blackfish, Yarra Pygmy Perch and Little Galaxias. However, the Millennium Drought exacerbated the impacts of



water

Top The participants and leading reintroduction experts at the IUCN Conservation Translocation Training; **Middle** Los Lunas Silvery Minnow Refugium; **Right** Nick Whiterod and Dr Brian Zimmerman



drainage and extraction and contributed to considerably reduced streamflow and water availability across the catchment. The autumn 2019 survey revealed simplification of the fish community, with the dominance of several freshwater generalist and alien species (combined accounting for 99.5% of the total catch) and the decline and loss of

specialist freshwater fishes. Indeed, the local extinction of Yarra Pygmy Perch and Little Galaxias is confirmed in the present study, whereas Southern Pygmy Perch and Mountain Galaxias persist as small and fragmented populations. The outcomes of this study further emphasise the urgent need for the provision of environmental

water requirements, (potential) translocations and regular (fish and water) monitoring in an attempt to conserve threatened specialist freshwater fishes across the catchment.

Rediscovery of Murray Hardyhead in a South Australian wetland

Encouragingly, Murray Hardyhead was rediscovered by Aquasave-NGT ecologists earlier in the year at wetland where they have not been recorded for more than five years. The rediscovery adds to the limited number of regional subpopulations. The site is under effective management involving environmental water and population monitoring by several stakeholders including the Commonwealth Environmental Water Holder, South Australian Murray-Darling Basin NRM Board, Nature Foundation South Australia and Aquasave-NGT.

New South Wales

Compiled by Luke Pearce

Moving Maccas

Without assisted genetic adaptation, Macquarie Perch populations are likely to decline further at a rapid rate. The loss of the species from key reaches is a real possibility.

Research from Pavlova et al (2017) has given sufficient confidence to activate a genetic rescue program for Macquarie Perch, with the assertion that the remnant populations are fragmented and small enough to lead to an increase in genetic inbreeding if no interventions are implemented. The research recommends regular small-scale translocations within catchments as a means to rapidly rescue populations from inbreeding depression and increase adaptive potential through genetic restoration.

'Reaching for Recovery' is a

Local Land Services and NSW DPI Fisheries project, funded by the Australian Government's National Landcare Program up until 2023. Its focus is on South East NSW populations, working collaboratively towards a 5, 10 and 50 year vision to improve Macquarie Perch populations and habitat. This project is a small step toward a long term vision. The continuation and growth of partnerships between community, government support agencies and researchers beyond the life of this project are vital to reaching the 50 year goal. The ground work for the broader genetic rescue of Macquarie Perch has now begun. DPI Fisheries is undertaking a number of research projects to inform fisheries managers on the utility of various source populations for genetic rescue. Two of these projects have focused on the Abercrombie River and Cataract Dam Macquarie Perch populations.

The first research project aims to estimate the population size of Macquarie Perch within a reach of the Abercrombie River using a series of mark-recapture experiments. The Abercrombie River supports one of the last regularly recruiting remnant populations of Macquarie perch within the New South Wales portion of the Murray-Darling Basin. Obtaining an estimate of population size is important to ensure the number of individuals removed for genetic rescue



Above Macca from Cataract ready for his big move

translocation

into the Retreat River do not adversely affect the Abercrombie population. The Retreat River population within the Lachlan catchment is a refuge population established from hatchery reared fish released in 2011 and 2014. To increase the genetic diversity of the Retreat River refuge population 50 Macquarie perch were directly translocated from the Abercrombie River into the Retreat River, this is the first step in an ongoing program that aims to translocate 50 Macquarie perch a year to bolster the genetic diversity of the refuge population.

The second study examines the biology and population dynamics of Macquarie Perch within Cataract Dam, a water storage reservoir of the Illawarra Region. In the early 1900s a population of Macquarie perch was translocated from a western drainage river into Cataract Dam, an eastern drainage reservoir outside their natural distribution. This self-sustaining population has since persisted, and has the potential to act as a reliable source to increase genetic diversity and population resilience of the western population of Macquarie Perch. Research will examine growth rates, size and age at sexual maturity, fecundity, population age structure, and environmental drivers of recruitment of Macquarie perch within Cataract Dam. This research will provide valuable insight into the utility of the Cataract Dam Macquarie perch population as a sustainable and appropriate source for genetic rescue translocations into the future. *The Reaching for Recovery project is supported by Local Land Services and NSW DPI Fisheries, through funding from the Australian Government's National Landcare Program.*

Destratification of Mannus Dam to protect Macquarie Perch

Mannus Creek is home to the only known remaining Macquarie perch population in the NSW Murray catchment. The population inhabits a very small length of the creek, less than 8km and is extremely vulnerable. Monitoring in 2016 and 2017 showed reasonable numbers, with recruitment in both years and a recovery in the population compared with past surveys. That was until the summer of 2017/18 when a major blue/green algal bloom occurred within Mannus Dam on the upper reaches of Mannus Creek. This algal bloom seeded the creek downstream and had major impacts on water quality, particularly dissolved oxygen. A



Above Mannus Creek Macca refuge pool, very low and green at the height of the algal bloom

similar algal bloom in the summer of 2018/2019 saw and even further declines in water quality coupled with very low flows and high temperatures. Recent monitoring has shown a major decline in the abundance of Macquarie perch within the system and an over decline in fish abundance and diversity.

As a management response to the threat of these ongoing algal blooms and the associated poor water, a destratification unit will be installed within Mannus Dam this December to break down the

thermal stratification with the dam and eliminate or significantly decrease these recurrent blue/green algal blooms.

Ongoing monitoring of the impacts on water quality within the dam and the creek downstream, combined with fish community monitoring will provide us with an understanding of how effective the unit has been.

NSW DPI Fisheries Teams up with Recreational Anglers to Bring Back Southern Pygmy Perch

NSW DPI Fisheries has teamed up with the Edward Wakool Angling Association (EWAA) and Middle Creek Farms to bring Southern pygmy perch back to the wetlands in Deniliquin and other areas across the state. Funds provided by the EWAA will support the captive breeding of Southern pygmy perch at Middle Creek Farm for the next three years, with the progeny of being used to re-establish populations within the recently restored wetland in Deniliquin and elsewhere across NSW.

The brood fish being used from this program were captured from drying pools within Coppabella Creek in January 2019, with the pools they were collected from, drying shortly after they were rescued.

It is wonderful to see an angling group focusing on a small species that they cannot catch and working to restore wetlands, rather than the large fish species and mostly stocking, like the majority of

these groups do. This highlights their knowledge and understanding regarding the aquatic environment more broadly and could be used as a great example for other such groups elsewhere.

Murray Hardy Head Make a Return to NSW

In November 2018, approximately 800 endangered Murray hardyhead were relocated from wetland sites in the South Australian Riverland to the Little Frenchman's Creek - a Murray River wetland on Wingilli Station in far west NSW.

Prior to the relocation, environmental water was added to the wetland to create habitat and water quality suitable for Murray hardyhead (particularly elevated salinity), and will be added as needed to maintain optimal depth and water quality to suit the new population.

If successful, this project would represent the first reintroduction of a fish considered to have been extinct in New South Wales.

And so far it indeed seems successful...

Monitoring by DPI Fisheries detected breeding success in the weeks following the re-introduction in late 2018 (as indicated by the appearance of juvenile Murray hardyhead). Numbers have continued to increase with more breeding evident this spring - around 3500 fish captured during recent monitoring in just a handful of sampling nets at three points along the 4km of wetland available to the Murray hardyhead. These ranged from 12mm long larvae to "huge" individuals over 9cm in length.

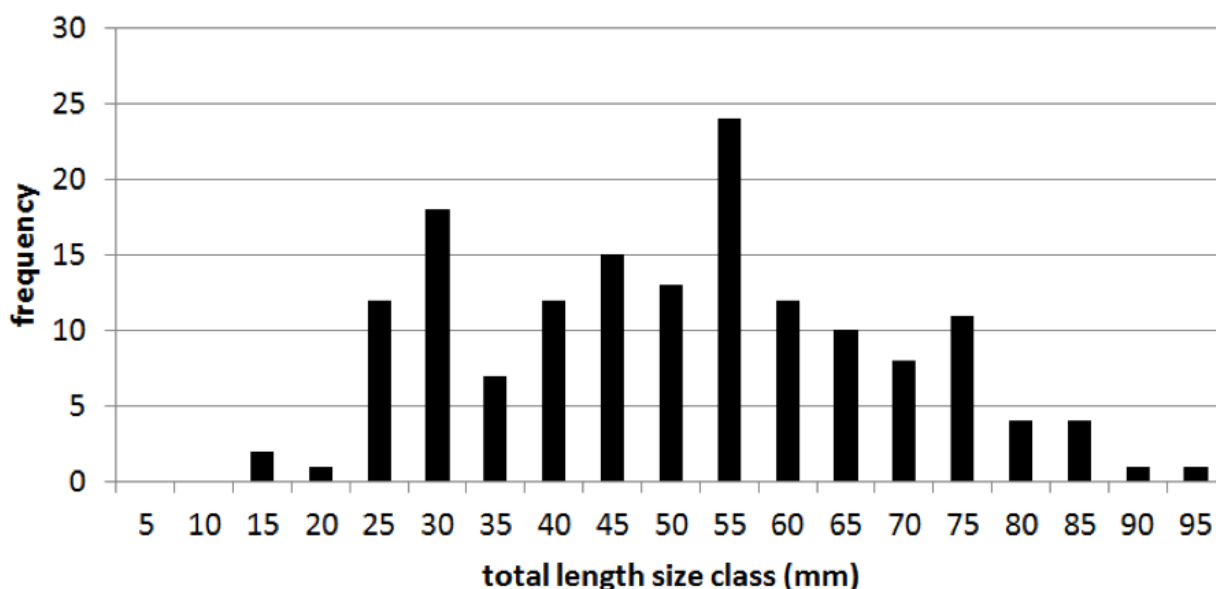
Left
Wetlands at Deniliquin in ready to receive Southern Pygmy Perch

We estimate there would currently be 10's of thousands (possibly 100's of thousands) of Murray hardyhead in the Little Frenchmans Creek - all descendants of the 800 fish we released there just 1 year ago! Whilst we don't anticipate abundances will necessarily remain this high, the results to date suggest we are well on the way to securing a NSW population of the species.

The Murray hardyhead relocation project a collaboration between: DPI Fisheries, Hazel Henry



Murray hardyhead 'total length' frequency 6 Nov 2019



Top and right *Murray hardyhead* collection and resulting length-frequency data



Trust (the owners of Wingilli Station), the Murray-Darling Wetlands Working Group, Western Local Land Services, the Commonwealth Environmental Water Office, Aquasave - Nature Glenelg Trust, and the South Australian Department for Environment and Water

Australian Capital Territory

Compiled by Mark Lintermans

Macquarie Perch translocation in the Cotter Catchment

The translocation program for Macquarie perch from Cotter Reservoir to the upper Cotter Catchment has continued with another 195 fish moved in 2019. This makes a total of 1150 Maccas that have been translocated to the upper Cotter since 2006. The numbers are relatively low because there is no hatchery program to produce Cotter fish, and so all translocations are wild-to-wild

movements. Monitoring has regularly detected survival, but no recruitment has been detected yet.

Genetic Rescue

In conjunction with Monash University and ACT Government, the program to improve genetic diversity in Macquarie perch in the lower Cotter Catchment continued in 2019 with 12 fish translocated from Cataract Reservoir near Sydney. This contributes to a total of 71 subadult fish translocated from Cataract since 2017. Genetic monitoring of finclips of young- of-year fish from the Cotter since 2017 is hoped to demonstrate whether genetic diversity has increased following the translocations (but finclips have not been analysed as yet).

Macquarie perch recruitment monitoring

Macquarie perch populations in the Mongarlowe and upper Murrumbidgee rivers in the Canberra region were monitored in March 2019 to determine levels of recruitment (Young-of-year and age 1+). Across 7 sites (4 Mongarlowe, 3 upper Murrumbidgee) Macquarie perch were detected at 3 (2 Mongarlowe, 1 Murrumbidgee) with recruitment only detected at a single site (Murrumbidgee). Parasite loads (*Lernaea*) were high in the Murrumbidgee site. Further monitoring is planned in 2020-2022. This research is part of the project 'Reaching for recovery of the Endangered Macquarie Perch in South East NSW', supported by South East Local Land Services through funding from the Australian Government's National Landcare Program. For further information contact Mark Lintermans.

Queensland

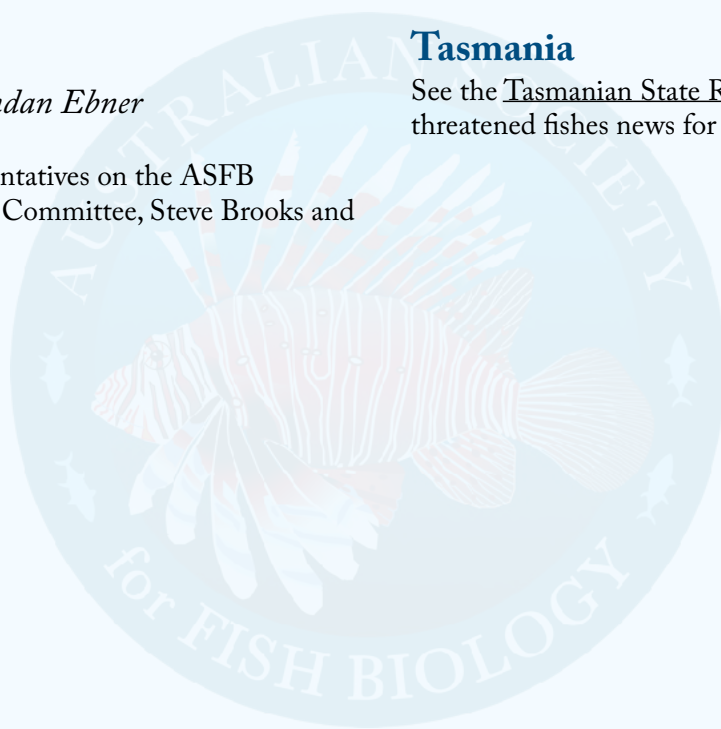
Compiled by Brendan Ebner

Queensland representatives on the ASFB Threatened Species Committee, Steve Brooks and

Brendan Ebner both attended the IUCN workshop in Melbourne earlier in the year aimed at classifying Australia's freshwater fish under IUCN criteria. A number of other Queensland practitioners were present including Pippa Kern, Rob Wager, Mark Kennard, Angela Arthington, also contributed at the workshop and there was substantial input from interstaters that have or continue to work in Queensland biogeographic provinces (notably Karl Moy, Peter Unmack, Adam Kerezy, Mark Lintermans and Mike Hammer). This was an opportunity to capture understanding of the status of a number of species in Queensland freshwaters and this might just pave the way for some bolstered threatened fish work in Queensland. Certainly at times the lack of listings of species has precluded a subset of funding submissions in recent times.

Tasmania

See the Tasmanian State Report section for threatened fishes news for this jurisdiction.



CONSERVATION STATUS OF AUSTRALIAN FISHES - 2019

ASFB Threatened Fishes Committee

Mark Lintermans, previous Co-Convenor

(Mark.Lintermans@canberra.edu.au)

IUCN conservation categories and criteria are used

* denotes taxa where formal taxonomic description has not been published but where listing is essential because of concern over their conservation status. Early formal publication will be encouraged to resolve their taxonomic status.

Category	Scientific Name	Common name
EXTINCT IN THE WILD	<i>Galaxias pedderensis</i>	Pedder galaxias
CRITICALLY ENDANGERED	<i>Brachionichthys hirsutus</i>	Spotted handfish
	<i>Carcharias taurus</i> (east coast population)	Grey nurse shark
	<i>Chlamydogobius micropterus</i>	Elizabeth Springs goby
	<i>Chlamydogobius squamigenus</i>	Edgbaston goby
	<i>Craterocephalus fluviatilis</i>	Murray hardyhead
	<i>Galaxias fontanus</i>	Swan galaxias
	<i>Galaxias fuscus</i>	Barred galaxias
	<i>Galaxias truttaceus hesperius</i>	Western trout minnow
	<i>Galaxias longifundus</i>	West Gippsland galaxias
	<i>Galaxias lanceolatus</i>	Tapered galaxias
	<i>Galaxias mungadhan</i>	Dargo galaxias
	<i>Galaxias aequipinnis</i>	East Gippsland galaxias
	<i>Galaxias supremus</i>	Kosciuszko galaxias
	<i>Galaxias mcdowalli</i>	McDowall's galaxias
	<i>Galaxias gunaikurnai</i>	Shaw galaxias
	<i>Galaxias brevissimus</i>	Short-tail galaxias
	<i>Galaxias sp. Tantangara</i>	Stocky galaxias
	<i>Glyphis glyphis</i>	Bizant River shark
	<i>Maccullochella macquariensis</i>	Trout cod
	<i>Maccullochella mariensis</i>	Mary River cod
	<i>Melanotaenia sp.</i>	Running River rainbowfish
	<i>Melanotaenia sp.</i>	Malanda rainbowfish
	<i>Nannoperca pygmaea</i>	Little pygmy perch

	<i>Pristis pristis</i>	Freshwater sawfish
	<i>Scaturiginichthys vermeilipinnis</i>	Redfinned blue-eye
	<i>Stiphodon semoni</i>	Opal cling goby
ENDANGERED		
	<i>Centrophorus harrissoni</i>	Harrisson's deepsea doofish
	<i>Galaxias auratus</i>	Golden galaxias
	<i>Galaxias johnstoni</i>	Clarence galaxias
	<i>Galaxias parvus</i>	Swamp galaxias
	<i>Galaxiella nigrostriata</i>	Black-striped minnow
	<i>Glyphis garricki</i>	Northern river shark
	<i>Lepidogalaxias salamandroides</i>	Salamanderfish
	<i>Maccullochella ikei</i>	Eastern cod
	<i>Macquaria australasica</i>	Macquarie perch
	<i>Melanotaenia eachamensis</i>	Lake Eacham rainbowfish
	<i>Nannoperca oxleyana</i>	Oxleyan pygmy perch
	<i>Paragalaxias dissimilis</i>	Shannon paragalaxias
	<i>Paragalaxias eleotroides</i>	Great Lake paragalaxias
	<i>Paragalaxias mesotes</i>	Arthurs paragalaxias
	<i>Pristis clavata</i>	Dwarf sawfish
	<i>Pristis zijsron</i>	Green sawfish
	<i>Pseudomugil mellis</i>	Honey blue-eye
	<i>Zearaja maugeana</i>	Maugean skate
VULNERABLE		
	<i>Anoxypristis cuspidata</i>	Narrow sawfish
	<i>Bidyanus bidyanus</i>	Silver perch
	<i>Brachaelurus colcloughi</i>	Colclough's shark
	<i>Brachionichthys politus</i>	Red handfish
	<i>Brachiopsilus ziebelli</i>	Ziebell's handfish
	<i>Cairnsichthys rhombosomoides</i>	Cairns rainbowfish
	<i>Carcharodon carcharias</i>	Great white shark
	<i>Carcharias taurus</i> (west coast population)	Grey nurse shark
	<i>Centrophorus zeehaani</i>	Southern dogfish
	<i>Chlamydogobius japalpa</i>	Finke River goby
	<i>Chlamydogobius gloveri</i>	Dalhousie goby
	<i>Craterocephalus amniculus</i>	Darling River hardyhead

<i>Craterocephalus dalhousiensis</i>	Dalhousie hardyhead
<i>Craterocephalus gloveri</i>	Glover's hardyhead
<i>Epinephelus daemeli</i>	Black rockcod
<i>Galaxias rostratus</i>	Flat-headed galaxias
<i>Galaxias tanycephalus</i>	Saddled galaxias
<i>Galaxiella pusilla</i>	Dwarf galaxias
<i>Guyu wujalwujalensis</i>	Bloomfield River cod
<i>Himantura dalyensis</i>	Freshwater whipray
<i>Maccullochella peelii</i>	Murray cod
<i>Melanotaenia utcheensis</i>	Utchee rainbowfish
<i>Milyeringa veritas</i>	Blind gudgeon
<i>Mogurnda clivicola</i>	Flinders Ranges gudgeon
<i>Mordacia praecox</i>	Non-parasitic lamprey
<i>Nannoperca obscura</i>	Yarra pygmy perch
<i>Nannoperca variegata</i>	Variiegated pygmy perch
<i>Nannatherina balstoni</i>	Balston's pygmy perch
<i>Neoceratodus forsteri</i>	Australian lungfish
<i>Neosilurus gloveri</i>	Dalhousie catfish
<i>Ophisternon candidum</i>	Blind cave eel
<i>Prototroctes maraena</i>	Australian grayling
<i>Rexea solandri</i> (eastern stock only)	Gemfish
<i>Rhincodon typus</i>	Whale shark

ASFB EDUCATION COMMITTEE REPORT -2019

Prepared by Stephen Beatty

From an Education Committee and student perspective, the Canberra Conference will be remembered as one of the best ever. Great work by Sherrie Chambers and Emily Lester (student reps) for excellent work towards student engagement including the Quiz Night. I have now stepped down as the Chair of the ASFB Education Committee and thank you all those people that have helped with the running of the committee over the last 4 years. I am thrilled to announce new joint Chairs of the Committee, Stacy Bierwagen (James Cook University) and Jason Thiem (NSW DPI).

AWARDS

Thanks again go to the FRDC for funding the awards and supporting the future of fisheries research in Australia. The John Glover Travel Bursaries supported 22 students to attend the Canberra conference.

This year we had 32 entries for the Gilbert Whitley oral presentation and John Lake poster awards. I thank the Whitley and Lake judges Karina Hall, Jane Williamson, Jason Thiem, Michael Hammer, Bonnie Holmes, Stacy Bierwagen, Brendan Ebner. The student research awards (Michael Hall for marine and Barry Jonassen freshwater awards) were of exceptional standard and congratulations to all students that entered. Thanks to the judges tasked with the difficult job of ranking the applications. This year the ASFB science communication video award included an early career category and congratulations to Dr Sarah Ugalde who took out this year's prize.

WORLD FISHERIES CONGRESS

The World Fisheries Congress in Adelaide is going to be a truly exciting conference and we encourage all students not to miss this meeting that will bring together delegates from around the globe. The registration cost for students attending is heavily subsidised, which is another great incentive to attend. ASFB is leading the Education and Training initiatives for the meeting. WFC Education and Training Committee Initiatives include:

- Student Mentoring Program
- Awards for supporting delegate travel from developing countries

- Speed talk competition
- Online video competition.

Please make sure to check out the website <https://wfc2020.com.au/>

ASFB FACEBOOK, TWITTER, NEWSLETTER

Communications Manager Andrew Katsis is thanked again for his great work in running the ASFB Facebook and Twitter active. Thanks also to Katherine Cure for her amazing effort in pulling this Newsletter together!

AWARD RECIPIENTS 2019

Gilbert P. Whitley Memorial Student Award Oral Presentation:

- Senior Winner: Christopher Hemingson, James Cook University.
- Junior Winner: Aaron Puckeridge University of New South Wales.

John Lake Poster Award:

- Senior Winner: Yi-Yang (Alex) Chen, Australian National University.

Student Competition in Science Communication (SCiSC)

Video award

- Early Career Research: Dr Sarah Ugalde, University of Tasmania.

Michael Hall Student Innovation Award for innovative research in marine fish or fisheries:

- Runner-up: Adam Downie, James Cook University. The changes in physiological performance associated with coral reef fish metamorphosis.
- Winner: David Ellis, Australian National University How does a popular fishery target species respond to seasonal changes in their preferred tropical seaweed habitat?

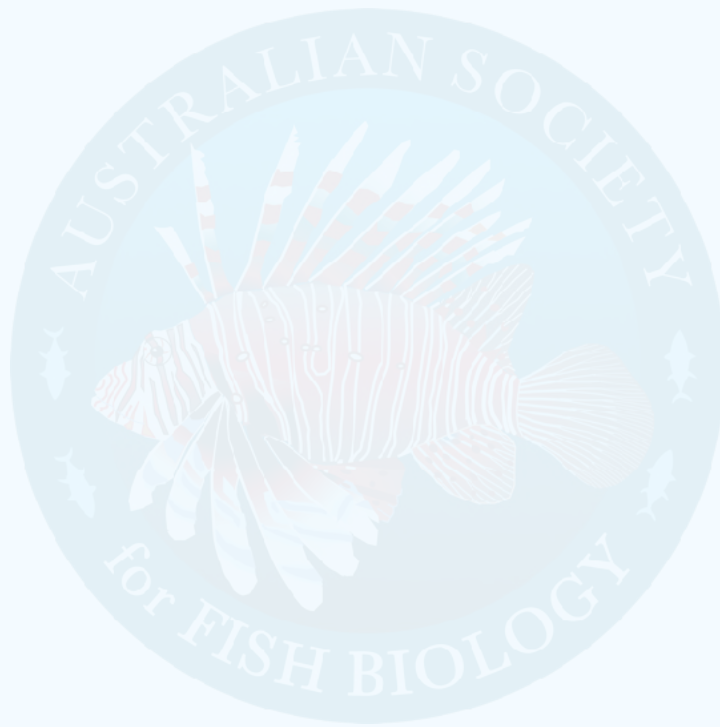
Barry Jonassen Award for Freshwater Research:

- Runner-up: Geoffrey Pierre Francois Mazue, Sydney University. The flexibility of individual and collective foraging strategies in an invasive species, the eastern mosquitofish (*Gambusia holbrooki*).

- Winner: Harriet Goodrich, University of Queensland. Optimising diets for sustainable aquaculture by reducing the energetic costs of digestion.

Student International Travel Award:

- Oliver Jewell, Murdoch University.



Treasurer's Report

By Lenore Litherland

FINANCIAL REPORT

The Society was in a good financial position on 30 June 2019 with retained earnings at the end of financial year of \$324,334.

The society maintains cash assets in three investment accounts and two transaction accounts. The amounts in each bank account as of June 30 2019 were:

- ASN transaction account = \$115,940
- General transaction account = \$17,645
- Business online saver = \$13,056
- Term deposit – Main = \$233,293
- Term deposit – K Radway Allen Bequest = \$21,357

The majority of income for 2018-19 was derived from membership fees (\$18,546) and sponsorships including the Societies partnership with FRDC to support conferences, workshops and student awards (\$18,000). Over the financial year, the Society raised \$6,901 in bank interest, primarily on the two term deposits. During 2018-2019 the Society also received a conference distribution of \$4,519.

The greatest expenditure items for the Society in 2018-19 were awards and prizes (\$30,124), which is an increase from previous years due to the introduction of additional awards and grants. Other key items of expenditure included ASN administration management and accounting fees (\$8,340), communications management consultant (\$4,500) and printing and publication costs (\$3,750). The society reported a slight loss for the financial year to June 30 2019 of \$5,386.

ASFB financial reports for the 2018-19 year were audited by Woottons. The audit concluded that the financial statements for ASFB for 2018-19 are drawn up to present

fairly the financial position of the society and are in accordance with the applicable accounting standards.

The income and expenditure statement, statement of financial position and Audit report can all be found with the AGM meeting minutes within this newsletter.

MEMBERSHIP

Between 2016 and 2019 Society membership has fluctuated from a low of 377 to a high of 438. As of June 30 2019 the Society has 411 financial members.

Membership breakdown is as follows:

Membership Category	#
life membership	13
ordinary membership - 1	103
ordinary membership - 3	170
retired membership - 1	12
student membership - 1	112
institutional newsletter subscription	1
	411

Society's Committees

Any member or non-member can contact the convenors of the various Committees with their concerns. Details about the function and membership of the Committees can be obtained from the convenors. Each Committee usually meets once a year during the Annual Conference.

Threatened Fishes Committee

Convenor:

Michael Hammer

Curator of Fishes, Museum & Art Gallery of the Northern Territory

PO Box 4646, Darwin, NT 0801

Ph (08) 8999 8253, fax (08) 89998289, email: michael.Hammer@nt.gov.au

Alien Fishes Committee

Convenor:

Ben Broadhurst

Ben.Broadhurst@canberra.edu.au

Education Committee

Convenor:

Dr Stephen Beatty

Murdoch University

S.Beatty@murdoch.edu.au

Fisheries Management Committee

