

FISH

Expanding services
Seafood stars
Exotic risks



VOLUME 21 NUMBER 4
DECEMBER 2013



FISH FACE REVISITED



World Aquaculture Adelaide 2014

Conference & Trade Show

7 - 11 June
Adelaide Convention Centre
South Australia



SPONSORSHIP / TRADE SHOW EXHIBITS
palmerroyd@gmail.com (Australia/New Zealand)
mario@marevent.com (International)

GENERAL ENQUIRIES
sarah-jane.day@aquaculture.org.au

CONFERENCE MANAGEMENT
worldaqua@aol.com

AUSTRALIA
www.aquaculture.org.au
INTERNATIONAL
www.was.org

Major
Sponsor
& Host



Conference
Sponsors



WAS Premier
Sponsors



Organisers





Australian Government
Fisheries Research and Development Corporation

FISH is published by the
FISHERIES RESEARCH AND DEVELOPMENT CORPORATION
 (FRDC)

The FRDC plans, invests in and manages fisheries research and development throughout Australia. It is a statutory authority within the portfolio of the Federal Minister for Agriculture, Fisheries and Forestry, jointly funded by the Australian Government and the fishing industry.

FRDC, Fisheries Research House, 25 Geils Court, Deakin, ACT 2600; Locked Bag 222, Deakin West, ACT 2600
 T 02 6285 0400 F 02 6285 0499 E frdc@frdc.com.au
 W www.frdc.com.au

FRDC DIRECTORY

Executive Director Patrick Hone
 T 02 6285 0410 E patrick.hone@frdc.com.au

Business Development Manager John Wilson
 T 02 6285 0411 E john.wilson@frdc.com.au

Manager Corporate Services Cheryl Cole
 T 02 6285 0418 E cheryl.cole@frdc.com.au

Office Administrator Rita Lin
 T 02 6285 0400 E rita.lin@frdc.com.au

Programs Manager Crispian Ashby
 T 02 6285 0425 E crispian.ashby@frdc.com.au

Projects Manager – Finance Annette Lyons
 T 02 6285 0417 E annette.lyons@frdc.com.au

Projects Manager – Research Pele Cannon
 T 02 6285 0416 E pele.cannon@frdc.com.au

Projects Manager – Research – Natural Resources and Sustainability Carolyn Stewardson
 T 02 6285 0419 E carolyn.stewardson@frdc.com.au

Programs Manager – People Development, RD&E Strategy Jo-Anne Ruscoe
 T 02 6285 0423 E jo-anne.ruscoe@frdc.com.au

Communications Manager Peter Horvat
 T 02 6285 0414 E peter.horvat@frdc.com.au

Communications Officer Julie Haldane
 T 02 6285 0415 E julie.haldane@frdc.com.au

Science Writer Ilaria Catizone
 T 02 6585 0445 E ilaria.catizone@frdc.com.au

Digital Communications Rachelle Etienne-Breidenbach
 T 02 8295 2389 E rachelle.etienne-breidenbach@frdc.com.au

SUBSCRIPTION

FISH is available free. To subscribe, contact the FRDC
 T 02 6285 0400 E frdc@frdc.com.au
 FISH is online at www.frdc.com.au

COPYRIGHT

Information in this edition may be reproduced freely as long as it is not for commercial benefit and FRDC's FISH is acknowledged as the source. Otherwise reproduction is forbidden without the written permission of the Fisheries Research and Development Corporation. Material in FISH is copyright. Reproduction of the material is encouraged. However, due acknowledgement is required.

DISCLAIMER

Information in FISH is not intended as professional advice. FRDC will not accept responsibility for any liability arising from reliance on the contents.

FISH is written and produced for the FRDC by **Coretext Pty Ltd.**

FRDC executive editor: Peter Horvat
Deputy editor: Julie Haldane

Coretext editor: Catherine Norwood
Creative director: Tim Claeys

Coretext, PO Box 12542, Melbourne Vic 8006
 T 03 9670 1168 F 03 9670 1127

E enquiries@coretext.com.au W www.coretext.com.au

ISSN: 1833-4784 (Print) ISSN: 2202-7122 (Digital)

F I S H

FEATURES

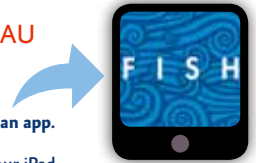
- 4 Students shaping the future
- 5 Fruits of the sea
- 6 Seafood expansion on Colbeck's agenda
- 8 A new take at Fish Face
- 11 Direct engagement
- 14 National awards honour industry leaders
- 16 Humble sardine gets a makeover
- 18 FRDC expands its role
- 21 Gascoyne leads WA's sustainability gap analysis
- 22 Scampi example prompts live prawn review
- 23 Seafood CRC begins rebid campaign
- 23 Greater access to fish safety information
- 24 Kingfish star is rising
- 26 The darker side of exotic ornamental fish
- 28 Fishing for the past
- 30 Flow-on effects
- 32 Biosecurity 'seatbelt' for salmon producers
- 34 Netting new leadership skills
- 35 Facebook forums help track SBT survival
- 36 Bass anglers take up habitat cause
- 38 Cooperative course for rocklobster industry
- 40 Emerging diseases on international agenda

REGULAR

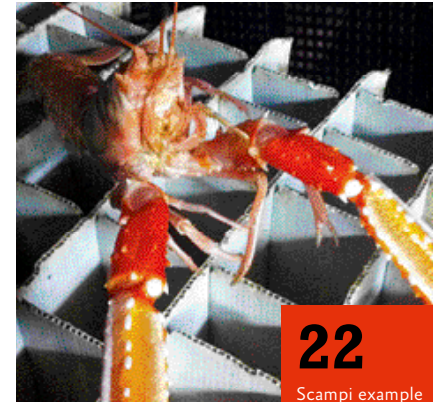
- 40 Movers and ...
- 41 Final reports
- 41 Calendar of events
- 43 Fish facts

FRDC HOME www.frdc.com.au
UPCOMING EVENTS www.frdc.com.au/Pages/Calendar.aspx
RESEARCH www.frdc.com.au/research/Pages/default.aspx
KNOWLEDGE www.frdc.com.au/knowledge/Pages/default.aspx
ENVIRONMENT www.frdc.com.au/environment/Pages/default.aspx
SEAFOOD CONSUMERS www.fishfiles.com.au
STOCK STATUS REPORTS www.fish.gov.au
VIDEOS
FRDC FISHERIESRESEARCHAU www.youtube.com/user/FisheriesResearchAU/videos
FISHFILES www.youtube.com/user/FRDCFishfiles

WWW.FRDC.COM.AU
 DECEMBER 2013



FISH magazine is available as an app. Please follow these steps:
 • Tap the App Store icon on your iPad
 • In the search function on the top right hand corner, type: FRDC FISH Magazine
 • The app icon will appear
 • Tap to download the app
 • Once downloaded, open the app and enjoy reading it



22
 Scampi example prompts live prawn review



26
 The darker side of exotic ornamental fish



36
 Bass anglers take up habitat cause

COVER
 Chef Josh Niland with fresh flathead, at Fish Face restaurant.
 Photo by Michelle Mossop

FEEDBACK
 FRDC welcomes your comments
 frdc@frdc.com.au

Students shaping the future

New information about the age and growth rates of Wahoo in the Coral Sea was the subject of the winning student presentation at the Australian Marine Sciences Association's (AMSA) annual conference this year.

The Wahoo (*Acanthocybium solandri*) research is part of Mitchell Zischke's PhD thesis; he has also created a model for the assessment of other bycatch species. More than 400 people attended the conference in July where he presented his findings.

The FRDC sponsors two student prizes to recognise the best presentations at the AMSA conference, an annual gathering of Australia's leading marine scientists to discuss future research directions. The second award was won by Stacey Trevathan-Tackett for her poster on microscale sediment chemistry during seagrass decomposition.

Sustainable harvesting

Mitchell Zischke says Wahoo is an incidentally caught species retained for sale in oceanic fisheries targeting tunas and coastal fisheries targeting mackerels. Although the Eastern Tuna and Billfish Fishery focuses on tuna and Swordfish (*Xiphias gladius*), 20 to 40 tonnes of Wahoo are also harvested each year. This contributes to an annual global catch of about 3000 tonnes. He found that the lack of biological information about the species was limiting stock assessment and management.

The work he presented at the conference is part of a larger body of information he has collected to assess life history, stock structure and sustainability of Wahoo. Stock structure data has allowed him to determine that Wahoo off the east coast of Australia are a single population, which do not appear to mix with other populations from the eastern Pacific Ocean.

Apart from examining the commercial catch, Mitchell Zischke also conducted surveys of recreational fishers at boat ramps

and in tackle stores to determine who was targeting Wahoo (and other pelagic species) and how many they were taking.

The final part of his PhD combined biological and fishery information to produce the first stock assessment of this species for the region (eastern Australia). He has found that the current levels of catch are below reference points, which means Wahoo is being fished at a sustainable level, given their fast growth and the low levels of catch.

His work provides a baseline for the management of commercial and recreational fisheries that catch Wahoo. It also provides important information to aid in future assessment of the species.

Seagrass meadows

Stacey Trevathan-Tackett's winning poster illustrated the work she is doing on the cycling of chemical compounds between seagrass and the environment during seagrass decomposition.

Seagrass meadows are a globally significant carbon sink. They cover only one per cent of the sea floor but capture about 70 per cent of marine carbon dioxide and at rates up to 40 times faster than terrestrial forests. This 'blue carbon' – atmospheric carbon captured and stored by marine environments – can remain stored for millennia.

Her research is centred around Gosford on the New South Wales central coast.

She is looking at factors that

can adversely impact seagrass meadows, and how the health of seagrass meadows affects their capacity to store carbon, including how carbon is released as the meadows decompose.

Found in coastal areas including salt marshes and mangroves, seagrass meadows are in decline around the world. About 30 per cent have been lost since records began in the late 1800s. Since the early 1990s, the rate of loss has accelerated and they are now declining at a rate of seven per cent per year.

A stock assessment and the role of seagrass meadows in sequestering 'blue carbon' were the subjects of two award-winning student presentations to Australia's leading marine scientists.



Award winner Stacey Trevathan-Tackett (left) with the FRDC's research project manager Carolyn Stewardson at the Australian Marine Sciences Association conference.



Mitchell Zischke holding a Wahoo (*Acanthocybium solandri*) sampled as part of his PhD research.

Stacey Trevathan-Tackett says declining water quality due to sediment and nutrient inputs from land can cause algal outbreaks that block out light and cause the death of seagrass. Physical disturbances such as dredging and boat groundings can also kill seagrass. With sea temperatures predicted to rise, she is investigating how high temperatures and high nutrient loads might affect seagrass decomposition, nutrient cycling and carbon stocks.

The role that coastal environments can play in a future low-carbon economy is a fast-growing area of research and Stacey Trevathan-Tackett's work is adding to the knowledge about how chemical, microbial and environmental factors come together to impact seagrass carbon storage. **F**

More information: Coral Coast Mariculture, 07 4156 1600

Fruits of the sea

For an aquaculturalist, Clive Keenan has an unusual problem. Rather than ensuring his product is kept cold on its way to market, he has to ensure it stays warm.

It is a challenge he found difficult to meet over winter and the supply of his novel product, the edible seaweed umi budo (‘green caviar’), was momentarily suspended. The tropical species has a shelf life of about three weeks, but dies and turns to mush if the temperature becomes too cold.

“It was quite unexpected,” he says. “You think you’ve solved all the problems of growing the stuff and then transport logistics comes up.”

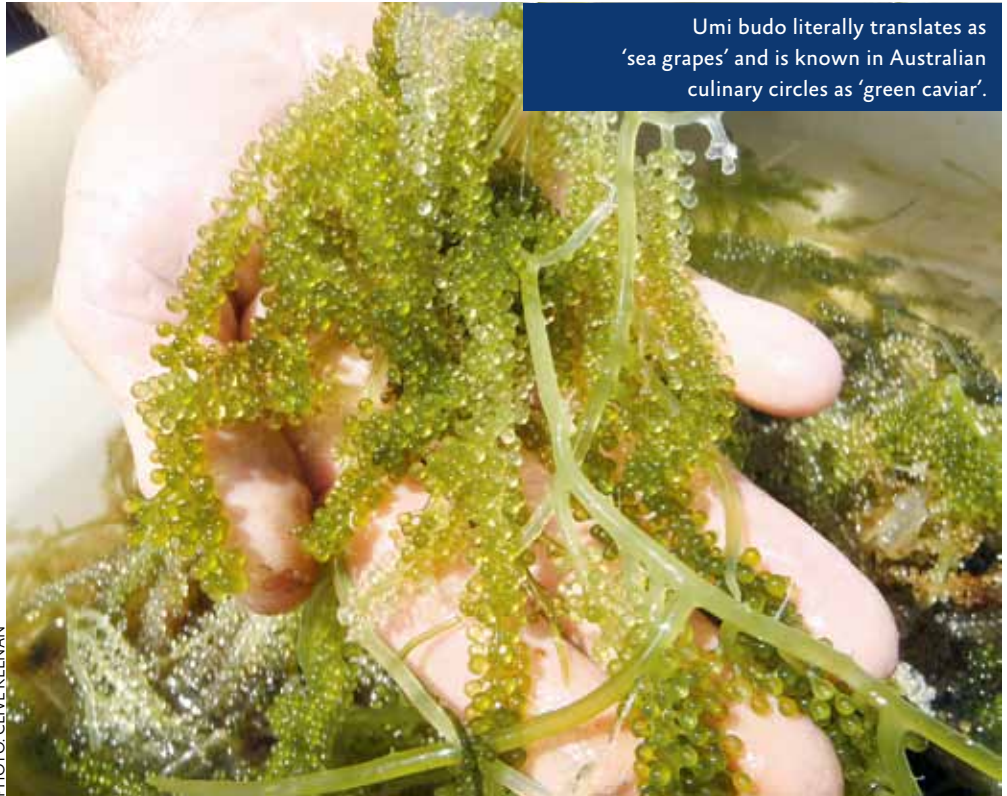
This prized and in-demand seaweed is commonly farmed in Japan and the Philippines, but as the first and only commercial producer in Australia, Clive Keenan has become accustomed to overcoming challenges. This included figuring out how to grow umi budo – literally translated as ‘sea grapes’ and known in Australian culinary circles as green caviar.

Keeping the details a closely guarded secret, Clive Keenan does divulge that his mariculture farm Coral Coast Mariculture, in Bundaberg, Queensland, has just the right balance of salinity and tropical conditions to foster the species’ growth.

“A lot of farms aren’t suitable because in the wet season salinity levels drop below the level the plants can tolerate,” he says. “Our farm just happens to be set up very well for maintaining high salinity levels through the wet season.”

In a very small catchment, fresh water runs past the farm for just a short period and a buffering pond further protects it from salinity dilution. Sandy-bottomed ponds also aid production, he says.

Umi budo first came onto Clive Keenan’s radar after he left his job as a fisheries researcher with the Queensland Department of Agriculture, Fisheries and Forestry and began working as an aquaculture consultant in the Philippines. There the seaweed is grown in abundance and sold in large batches at markets.



Umi budo literally translates as ‘sea grapes’ and is known in Australian culinary circles as ‘green caviar’.

PHOTO: CLIVE KEENAN

He was also aware of the seaweed’s proliferation in Japan’s Okinawa, where it has been cultured for centuries and is known as ‘the longevity seaweed’ and linked to the population’s renowned longevity.

After finding a wild population of the species *Caulerpa lentillifera* growing in Queensland’s Hervey Bay, Clive Keenan decided to try his luck at home. Starting with a small biomass he began experimenting and after two years of trials, he found the right balance.

This year he began selling the seaweed commercially, mostly to Australia’s top restaurants, and demand rose quickly to about 40 kilograms per week. “We have been selling all we can produce,” he says.

Clive Keenan had an inkling of the seaweed’s potential as a food product, given its popularity in Japan and the Philippines. But he was still surprised and delighted by the response when the product was launched at the Noosa International Food and Wine Festival in May this year. Only two of the thousands of people who tried it at the festival did not like it.

Tasting like caviar with a salty flavour of the sea, umi budo is one of the best edible

seaweeds, he says. “It’s got a lot of texture to it. The little sea balls ‘pop’ and release the flavour into your mouth.”

Umi budo represents about 10 per cent of his aquaculture business, which is largely dedicated to whiting production. He hopes to capitalise on the mariculture possibilities of the species, introducing it to his whiting ponds as well as his fledgling soft shell Blue Swimmer Crab enterprise.

“The whiting don’t eat it and it reduces the nutrient levels in the ponds and puts oxygen back in the water,” he says. “We think we can integrate production so we get clean, nutrient-rich water and two products out of the same system.”

Algae, he says, is an underused resource in Australia. He believes there is potential for the use of mass-produced marine algae in the production of biodiesel and has undertaken a ‘desk study’ into the opportunity.

“Some species of algae, if they are treated correctly, produce up to 60 per cent of their mass in oil. So that really is an opportunity for the future,” he says. “And once you extract the oil you end up with a high-protein byproduct.” **F**



Senator Richard Colbeck took to the water while attending the 2013 Seafood Directions Conference.

PHOTO: STEVEN DAVIES

SEAFOOD EXPANSION ON COLBECK'S AGENDA

At the top of the new Australian Government's 'to do' list is wider recognition of the good work it is doing in the area of fisheries management, and improving engagement between industry and the broader community.

The senate wing of Parliament House is a long way from Tasmania's River Derwent, but the fishing rod propped in the corner of his office is a reminder of Federal Senator Richard Colbeck's long-standing affinity with the sea.

The new Parliamentary Secretary to the Minister for Agriculture spent many happy days fishing from a 'tinny' in the River Derwent as a young boy, and later stalking trout in the creek on his farm in Wilmot; skills and experience that he notes are important to many Australians.

Now that he is professionally involved and has national responsibility for all three sectors of the fishing industry (commercial,

indigenous and recreational), he says his vision is to improve engagement and acceptance of an industry that is under siege.

"You constantly hear bad stories. But we've got a good story to tell about our fisheries here in Australia; we've done a lot of hard work and there's been a lot of pain as part of that process. That needs to be recognised," Senator Colbeck says.

Senator Colbeck acknowledges that a small number of individual fish stocks need work to improve. But he insists we need to get beyond a perspective based on what is happening in other parts of the world.

Growing and developing the industry (wild catch and aquaculture), investing in

research, quantifying the economic and social contribution of the recreational sector, addressing the priorities of the FRDC's Indigenous Reference Group, recognising OceanWatch as a natural resource management (NRM) group and resolving market access issues are some of the priorities for his government's first term in office.

Growth and development

Senator Colbeck says increasing production from both wild catch and aquaculture will be essential if Australia is to help feed the growing world population.

"I think that there are some wild-catch fisheries that aren't as developed as they

could be yet; we need to do the scientific work to underpin confidence in expanding those,' he says.

"I'm also particularly interested in the development of aquaculture. Our policy is to develop a national aquaculture strategy and we will start on that soon."

Senator Colbeck cites opportunities for growth in the Atlantic Salmon (*Salmo salar*) industry in Tasmania, the shellfish and abalone industries around the country, and for the prawn industry in the northern part of Australia.

"There hasn't been a new prawn farm in Queensland for 10 years or more. I'd really like to help these industries because they provide significant opportunities for regional development," he says. Engaging the states and territories to harmonise planning and access will be key to growing these sectors.

Part of the broader federal government policy is to increase investment in research and development for primary industries. Fisheries will access a portion of the \$100 million earmarked in the forward budget estimates for that purpose. This includes \$5 million to target invasive marine species.

The investment will help with the goals of growth and sustainability, while the research findings help to give the broader community the confidence to know they are eating safe and sustainable seafood.

Indigenous fishing sector

To ensure fair access for the indigenous fishing sector, Senator Colbeck will consult with Northern Territory Senator Nigel Scullion, Minister for Indigenous Affairs, who is a former commercial fisher. He will also work with the FRDC's Indigenous Reference Group.

"When you look at the broader fisheries strategy, part of the challenge is to work out who accesses what, where, and in what proportion. There's been a process through the FRDC for Indigenous engagement. We want to actively pursue that as part of a broader stakeholder engagement process," Senator Colbeck says.

Recreational fishing sector

The Australian Government has also given an undertaking to work with the recreational sector to build better lines of communication. It is important that all sectors are able to be brought together and discuss key issues.

A key issue that needs to be addressed for the recreational sector is the collection of data. This will require coming up with consistent ways that data can be collected on not only the social and economic impact of

recreational fishing, but also participation and catch. This information is important for the long-term management of our fisheries.

OceanWatch

Under the new Australian Government the marine sector now has its first formally recognised NRM agency – OceanWatch.

OceanWatch is a not-for-profit organisation that focuses on practical solutions to environmental problems affecting coastal environments and estuaries, with programs to enhance fish habitats and improve water quality.

Although primarily aligned with the commercial fishing sector through its extension around sustainable fishing technologies, OceanWatch has already been working with Indigenous communities in the Gulf of Carpentaria on the GhostNets program.

Senator Colbeck also sees potential for it to work with the recreational fishing sector. He envisions OceanWatch as the marine counterpart to the Landcare movement, inspiring new attitudes and behavioural change in fishing communities, as Landcare has in farming communities.

Market access

Senator Colbeck acknowledges that there are many frustrations for the commercial fishing sector around access to markets in South-East Asia and says resolving these access issues is important for the industry.

For example, the 15 per cent tariff on Australian rocklobsters imported into China immediately puts Australian producers at a significant disadvantage, particularly when their product is worth \$90 per kilogram.

"The best way we can fix these things is to finalise our trade arrangements and agreements. We're openly pushing ahead with our free trade negotiations with China, Japan and South Korea – China being an important one."

Industry engagement

Senator Colbeck sees room for improvement in the organisation of both the recreational and commercial fishing sectors.

The recreational fishing sector plays an important role in tourism and the economy, with its reach into tackle shops, boat sales, accommodation and employment, but he wants to see them strengthen the structure of their representation.

The commercial sector, too, needs work, he says.

"You've got the National Seafood Industry Alliance, you've got the

Commonwealth Fisheries Association, you've got the individual state-based organisations that come up through the National Seafood Industry Alliance. You've got individual fishery-based organisations, too. It is still disparate, and that needs drawing together.

"[The commercial sector] wants to have a sustainable fishery that doesn't cost too much to access. In that context they're not much different from the recreational fishers.

"They just want to do their job without a whole heap of people beating them up, and they are feeling a bit beaten up at the moment. So there's some work to do with those representative groups to give them a solid foundation – both commercial and recreational."

Senator Colbeck says he is not interested in getting into a dust-up between the recreational and the commercial fishers. "If they end up fighting with each other, they both risk losing the thing they are trying to secure: access to their fisheries, which applies to the Indigenous community as well." **F**

SOMETHING SPECIAL

Senator Richard Colbeck's role provides him with opportunities to sample some of the best seafood Australia has to offer.

"There are some brilliant products on the market out there now. Oysters, mussels, scallops ... Atlantic Salmon and Rainbow Trout. Abalone is very special, and rocklobster is a treat. There's so much that's good about Australian seafood," he says.

But Bastard Trumpeter (*Latridopsis forsteri*), the fish he used to catch as a kid, remains his favourite seafood dish.

"Cooked very simply, the way my mum did it. Seasoned with flour, salt and pepper and pan fried. It's probably for sentimental reasons, but that's the one for me."



(From left) Andrew Puglisi, Senator Richard Colbeck and SA Senator Sean Edwards at Kinkawooka Mussel Factory.



Chef Josh Niland with fresh John Dory – the cold room is beneath the tiny Fish Face restaurant and reached by taking the stairs down into the laneway.

A new take at Fish Face

Sydney's popular Fish Face restaurant has returned to its roots with Fish and Chips by Fish Face, a new take on Australia's favourite takeaway. Order fish and chips here and you will not be walking away with a greasy battered fillet of indeterminate origin.

The fish and chippery maintains the reputation for excellence that Fish Face has developed under the direction of owner-chef Steve Hodges over the past 10 years, while the restaurant itself relocates from Darlinghurst to Double Bay, opening in November.

Chef Josh Niland, who worked with Steve Hodges several years ago after finishing his apprenticeship so that he could "learn how to cook fish", will also be joining the new venture. Still passionate about fish, Josh Niland has returned as a partner in the business and will take on the role of executive chef, overseeing all of Fish Face's operations, including Fish Face Original and Fish Face Dining – two restaurants in one at the new Double Bay location.

Part of the new operation will retain the Darlinghurst cafe-style ambiance, with seating increased from 30 to 50. Added to this will be a bar and waiting area, separating Fish Face Original from the new Fish Face Dining, which will offer a more up-market dining experience, and room for another 50 diners. Each element of the business will offer a different dining experience, but all based on exceptional-quality sustainable seafood.

Josh Niland says he believes that fish has always played second fiddle in the general media to more glamorous, 'user-friendly' proteins such as pork, beef and poultry, but that is something he hopes will change.

"Cooking at Fish Face gives me the opportunity to educate not only myself and my kitchen team about the correct ways to cook, store and process fish but also the general public when they come and dine.

"I love fish for its fragility and vast array of species available to us in Australia. I am very passionate about Australian produce, especially wild Australian fish. We are so lucky as a country to have access to some of the world's greatest marine life."

Based at the fish and chippery for the time being, Josh Niland starts work at 10am, six days a week, to begin the preparation of fish for the evening rush. "I believe that when you buy a fish you buy all of it – the head, guts and scales – all still intact," he says. "Water and direct contact of ice should be avoided at all costs throughout the whole process of cutting, scaling, gutting and storing."

There are always at least eight species on the menu at Fish and Chips by Fish Face, and often a dozen or more. There are also four different cooking techniques, each matched to the fish on offer, to optimise the dining experience.

"Buying a fish whole gives you so many options: cooking the fish with the skin on, cooking it whole, searing the liver, salting its roe sacks, poaching its head, frying its scales, fish stocks and sauces, making salts out of the skin ... the list goes on.

"When you have the best quality fish available it not only inspires you to handle and cook it with care and precision but to also ensure that what accompanies it is of an equally high standard. This is why so much testing was invested in our vodka, honey and beer batter and why I strive to have carefully

considered garnishes chosen to match the flavour profile of each fish."

When it comes to the fish and chips menu, he says that on the traditional takeaway nights, Friday and Saturday, they ensure the well-recognised and popular species such as John Dory and snapper are available. But earlier in the week there are opportunities to experiment with different, less well-known species and to try something new, with the support of Fish Face's many dedicated regulars.

"When we get a new species we cook it in as many different ways as we can

PHOTOS: MICHELLE MOSSOP



Sydney chef Josh Niland making vodka batter fried Pink Ling – the most popular dish at Fish Face, his small but perfectly formed restaurant in Darlinghurst.

think of to find the best method for that fish. And often we will send out a piece of something new for our customers to try. We've converted so many people to trying new species, whether it's Ocean Perch, or Pink Ling, one of the different dory species or Shovelnose Ray, known locally as Shovelnose Shark.

"I love arriving at Fish Face every day and seeing what has been delivered, whether it's Pink Ling from the market or our friend George giving us an excited phone call, saying 'I've got some beautiful Blue-Eyes today ... interested?'"

Appetite for Excellence

Josh Niland was a national finalist in the 2013 Appetite for Excellence program, and travelled to South Australia as part of the Rural Industries Research and Development Corporation's education program, which provides a first-hand understanding of Australia's primary industries. The six-day tour of South Australia started in Adelaide, heading out through the Adelaide Hills, then the Fleurieu Peninsula, the Coorong, and finished in the Barossa Valley. The highlight of the visit for Josh Niland was going fishing on the Coorong with local fisher Glen Hill. This provided him with an insight into one of Australia's most sustainable fisheries – and to taste fish as fresh as you can possibly get. **F**



Crumbed shark clasper.

PHOTOS: MICHELLE MOSSOP

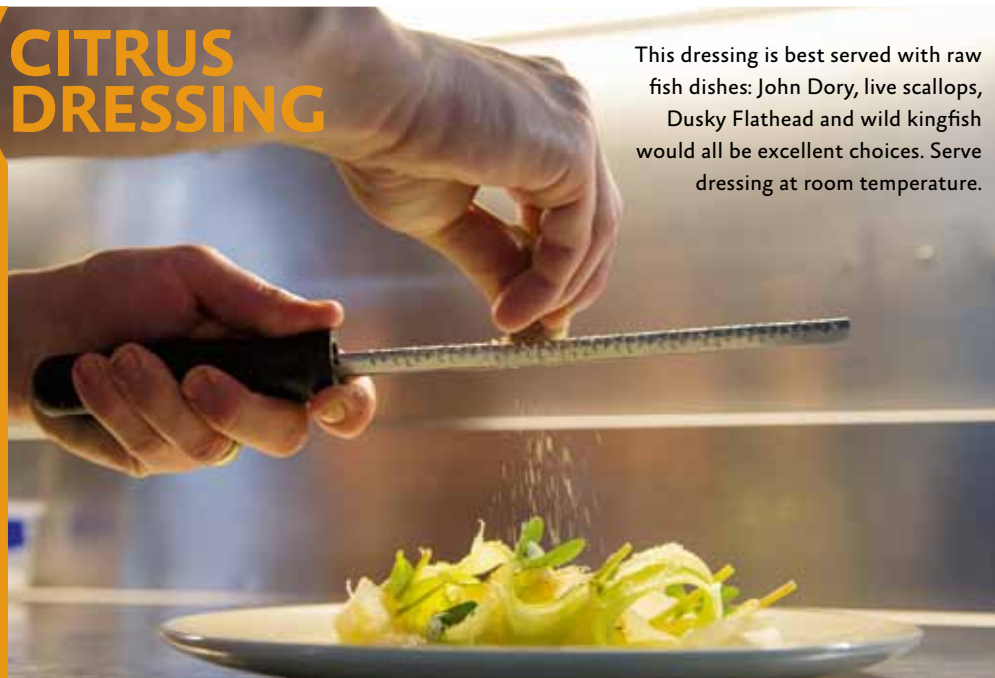
INGREDIENTS

- 75ml lemon juice
- 75ml lime juice
- 100ml white soy
- 3 teaspoons sugar
- 2 finger limes, pearls
- 1 pomelo segment
- 2 lemons, zest and diced segments
- 2 limes, zest and diced segments
- 250ml extra virgin olive oil
- 150ml grape seed oil

INSTRUCTIONS

To prepare the base for the dressing start by adding the juice and zest from the lemons and limes to a bowl then mixing the white soy and sugar in to dissolve. Add diced segments of lemon, lime, and pomelo and finger lime pearls. After an hour, once the dressing has had a chance to develop, adjust with more sugar or white soy. Add the oils on top of the base and stir before spooning the dressing over the dish. **JOSH NILAND**

CITRUS DRESSING



This dressing is best served with raw fish dishes: John Dory, live scallops, Dusky Flathead and wild kingfish would all be excellent choices. Serve dressing at room temperature.



PHOTO: STEVEN DAVIES

Direct engagement

The seafood industry's national conference focused on the importance of connecting with consumers and markets in Australia and abroad to tell the industry story.

The theme of the 2013 Seafood Directions Conference, hosted on 27 to 30 October this year on South Australia's Eyre Peninsula, was 'Adapt, Interact & See Food'. These themes were reflected in many of the events and presentations at the four-day event, at which market opportunities arising from evolving international tastes for seafood, the need for the industry to develop a unified front and the importance of community engagement were discussed.

The conference itself began by engaging the local community through the Family and Fishers Trade Show held at the Port Lincoln Marina. This featured cooking demonstrations by Hong Kong's three-time Iron Chef winner Wong Wing Chee and a dragon boat race that pitted conference delegates from three different states against each other.

Holding Seafood Directions in one of Australia's premier seafood ports proved an outstanding success, says the FRDC's

communications manager Peter Horvat, who was a member of the conference organising committee.

"The town was humming with seafood industry representatives from across Australia and even a couple from New Zealand. It was pleasing to see the number of local industry people who attended, even if it was just for a coffee and a chat with friends they knew. I think holding conferences and events like this in bigger regional areas has significant value, not only to the participants but the whole community," Peter Horvat says.

Industry awards

More than 240 seafood industry representatives attended workshops and presentations at the Port Lincoln Hotel as part of the conference. The Port Lincoln Hotel ballroom was at capacity for the three-day conference, and the conference's 7th National

Seafood Industry Awards dinner on Sunday night attracted more than 300 people to the Nautilus Theatre, where 32 of the industry's most outstanding leaders were inducted into the Seafood Hall of Fame. FRDC executive director Patrick Hone reflected that the Hall of Fame announcements represented a new kind of celebration of the industry's most dynamic players.

"One of the really poignant things for me was we recognised those who were present and not present, and those who have passed away. Every year in this industry we lose many great people. It is a fantastic thing that we will remember the people who have done great things in this industry," Patrick Hone said.

The 2013 National Seafood Industry Awards were also presented during the dinner, with 11 winners announced as the industry leaders across a range of categories including production, research, promotion, education and training (see page 14).



Jonas Woolford (left) hands baton to Brad Adams, chair of the Western Australian Fishing Industry Council.

Clean green message

This year's conference saw widespread recognition and adoption of premium, 'clean and green' branding within the industry following presentations at the 2011 conference that called for Australia's strong fisheries management to be translated into a marketing advantage. Leading the charge at the conference was Federal Senator Richard Colbeck, Parliamentary Secretary to the Minister for Agriculture.

"We've got a good story to tell about our fisheries here in Australia and we need to start telling it to people. We've done a lot of hard work and there's been a lot of pain as part of that process. That needs to be recognised," Senator Colbeck said.

One of the major avenues for boosting revenue in the Australian seafood industry hinges on forging stronger connections with China. This was the subject of a presentation by Sam Guthrie, associate partner with strategic communications company Newgate, who works with Australian primary industries to help them gain access to this powerful market.

Trade with China

He said that until now many Australian seafood exporters have taken a 'lone wolf' approach to their relationship with China, relying on a relationship with one key

importer. Industry unity was necessary if Australia was to compete with other countries, such as Chile and New Zealand, for a share of the market, he said, with the latter country's trade delegations particularly visible in China.

He said that Australia has a story to tell about the 'romance' of its landscape. "If you're living in the midst of a second-tier or third-tier Chinese city, the idea of rolling hills or blue sea around Australia is something that propels you into wanting to buy something," Sam Guthrie said.

A presentation from the Australian Wild Abalone (AWA) group and the Australian Seafood Cooperative Research Centre (Seafood CRC) added to this with an overview of their efforts to establish markets in China. The AWA group is a collective of 10 abalone companies that this year launched a new marketing and branding campaign in China focused on the story behind their wild-caught product.

Jayne Gallagher, program manager (product and market development) at the Seafood CRC, and Jonas Woolford, of abalone company Eyrewoolf Enterprises, described their efforts to engage with the Chinese supply chain over the past two years. They said the depictions of the pristine waters from which Australian abalone is harvested promotes the exotic nature of the product and of abalone diving itself.

Community power

Community engagement was repeatedly identified as crucial for the survival of the Australian seafood industry.

Environmental consultant Nicky Mazur, an Adjunct Research Fellow at Charles Sturt University, reported on extensive data on the social acceptability of the commercial fishing sector collected through surveys.

"Overall, we found that there are strong levels of acceptance of the sector, but that acceptance was conditional upon people believing that the sector could be effectively regulated and be able to demonstrate its environmental stewardship," Nicky Mazur said.

"Respondents were also supportive of Australian seafood, versus imports that might come from countries with lower standards of environmental protection."

She said that those people who rated the industry's acceptability lower had stronger environmental concerns and were more concerned about government ability to regulate overfishing. The industry needed to focus on long-term trust-building, she suggested.

"Controversy often happens because of inadequate engagement. Perhaps less time should be focused on the sector's problems, and more time devoted to identifying a more aspirational and positive vision

“Respondents were also supportive of Australian seafood, versus imports that might come from countries with lower standards of environmental protection.”

– NICKY MAZUR

for the sector; one that may have better synergy with dominant social norms and that make it easier to gain widespread stakeholder involvement and public support. For instance, continual improvement and environmental stewardship and how the sector provides healthy seafood.”

The importance of building trust through transparency was highlighted by Fiona Ewing, community engagement officer for Atlantic Salmon (*Salmo salar*) producer Tassal, who discussed the company’s reporting on environmental management. “I’m just putting together our third sustainability report, and we have never had any bad feedback,” she said.

Summarising the conference, Patrick Hone spoke about the importance of the many different sectors of the industry coming together.

He described the collective role of recreational fishers, represented at the conference by the managing director of the Australian Recreational Fishing Foundation, Allan Hansard, as “an incredibly strong alliance ... of a very diverse group of people”.

He also forecast that the FRDC would be boosting its work with Indigenous communities.

“We want to mainstream the word ‘Indigenous’ into fishing. You will see a lot more proactive work from the FRDC to try and profile and include Indigenous people in the work we do.”

The 2015 Seafood Directions Conference and National Seafood Industry Awards presentations will be held in Perth.

FRDC director Peter O’Brien provided the final summing of the conference, identifying four issues from the content of the conference that would require a unified response:

- Social licence to operate;
- Market access;
- Sustainability; and
- Productivity.

These were not issues that any one individual or group could resolve, he said.

Peter O’Brien said FRDC was now

PHOTOS: FRDC



beginning the conversation to shape its next five year research, development and extension plan. “We want to deliver the science impact for vibrant sustainable fisheries. We think that our R&D plan can and should be set within a narrative of

what industry, government and the community want.”

Peter O’Brien called for input and ideas from all participants on how the FRDC could help assist taking the Australian seafood industry forward. **F**

Family fishers tell their stories

Twelve months ago, the career of Spanish Mackerel (*Scomberomorus commerson*) fisher Bruce Davey took a surprising turn. Through an unexpected meeting of minds and passions, the proud captain of the *FV Wildcard*, who earns his living on the Gulf of Carpentaria, found himself producing a documentary film.

Drawing the Line tells the story of family fishing businesses from around Australia as they seek to adapt to the changes to their fishing territory expected to result from the introduction of the proposed Australian marine parks. The film premiered as part of the Seafood Directions Conference in Port Lincoln, South Australia, and was introduced by Senator Richard Colbeck.

The idea for the film sparked when Bruce Davey employed a new deckhand – Alaneo Gloor, the son of a friend and a recent graduate from a film course at Melbourne’s Swinburne University. The young filmmaker started scribbling a script for a film that tells the story of the Davey family and the *FV Wildcard*. Soon they were joined by film and TV insider Matt Blyth, who recently worked on *The Great Gatsby*. What was originally intended as a series of YouTube videos ended up embracing fishing stories from around the country.

“The three of us went around Australia, every state and territory: filming, putting *Drawing the Line* together, doing multiple interviews with multiple people, and here I am 12 months later, pretty damn proud to say that we’ve produced an amazing, heartfelt documentary,” Bruce Davey says.

The film also draws on the expertise of fisheries scientists Colin Buxton and Caleb Gardner of the University of Tasmania and Bob Kearney of the University of Canberra. – ALEXANDRA ROGINSKI

More information: www.drawingthelinefilm.com

National awards honour INDUSTRY LEADERS

Professional excellence, innovation and a commitment to sustainable fisheries were among the attributes of those recognised with national industry awards.

Australia's seafood industry honoured its highest achievers at the 7th National Seafood Industry Awards, held in Port Lincoln, South Australia, in October. More than 300 people attended the gala event, which showcased the industry's value to the national economy, its professionalism and commitment to supplying some of the finest seafood in the world to local, national and international markets.

The awards also launched the biennial Seafood Directions Conference, from 27 to 30 October, which brought together representatives from all sectors of the seafood industry to discuss the latest research, industry issues and trends.

Seafood Directions chair Jonas Woolford said the national awards provided an auspicious start to the conference. "They celebrate the positive contributions of individuals, partnerships, businesses and organisations towards a sustainable and profitable Australian seafood industry." He says the strong field of entrants from all states was shortlisted to three in each category for final judging.

The evening's highest honour, the National Seafood Industry Ambassador Award, was presented to Western Australian rocklobster fisher John Cole AM. John Cole has been a passionate advocate for the promotion and advancement of the industry for more than 50 years, including the need for better science and a coordinated approach to decision-making.

Other finalists for this award were Tasmania's Allen Hansen, a pioneer of the

abalone industry, and Peter Dundas Smith, chair of the Australian Seafood Cooperative Research Centre and former executive director of the FRDC.

Australia's leading producer of Atlantic Salmon (*Salmo salar*), Tassal, took out the 2013 National Seafood Industry Large Business Award. This recognises the company's role as a major employer in Tasmania (850 staff) and its market leadership, as well as commitment to maintaining internationally recognised standard of sustainable aquaculture production. Runners-up were WA premium seafood wholesaler Endeavour Foods and the South Australian Prawn Co-operative.

The National Seafood Industry Primary Producer Award winner was Marine Produce Australia, which farms Barramundi (*Lates calcarifer*) at Cone Bay, north of Broome, in WA. Runners-up were Humpty Doo Barramundi, based on the Adelaide River south of Darwin, and mussel and scallop producer Spring Bay Seafoods, from Triabunna, Tasmania.

Australia Bay Seafoods claimed the National Seafood Industry Environmental Award for its efforts in reducing bycatch of large marine species by 95 per cent, and adopting new technology to reduce the impact of trawling in its Northern Territory fisheries. Runners-up were the Moreton Bay Seafood Industry Association and the Victorian Bay and Inlet Fisheries Association.

Del Giorno's Cafe Restaurant in Port Lincoln, SA, won the National Seafood Industry Best Restaurant Award for its

efforts in combining quality seafood dining with promotion of the region's seafood through initiatives such as seafood masterclasses, staff education and Seafood Lovers Weekend programs. Runners-up were Hallam's Waterfront Restaurant in Launceston, Tasmania, and Saltneppa Café Ristorante in Darwin.

The National Seafood Industry Award for the Best Fish and Chips went to Sweetlips, which has outlets in Leederville, Fremantle and Scarborough, WA, and focuses on fresh, locally harvested seafood,



Wong Wing Chee (left) and Best Restaurant Award winner Kris Bunder

Best Fish and Chips Award winner Michael Waldcock (left) with Patrick Hone.



PHOTOS: STEVEN DAVIES

Graeme Turk (left) with Hall of Fame inductees Gloria and Henry Jones.



prepared from whole fish in-store. Runners-up were the Point Cartwright Seafood Market in Queensland and the Barra Bar Seafood Cafe in Darwin.

The Darwin Fish Market, based at Fisherman's Wharf, won the 2013 Small Business Award. The Australian-only seafood wholesaler and retailer has developed a range of new products and also provides education campaigns, cooking programs and tastings. Runners-up were the processor and export business Seafoods Tasmania and She Sells Seafood, a fishmonger in Castlemaine, Victoria.

Austral Fisheries, based in Perth, won the National Seafood Industry Promotion Award for its work with the Marine Stewardship Council (MSC) to achieve sustainability certification for all four of the fisheries it operates in. Specific initiatives include the launch of 'Glacier 51'-branded MSC-certified Patagonian Toothfish (*Dissostichus eleginoides*) and promotion of its MSC-certified prawns.

Runners-up were Tasmanian rocklobster fisher Christopher Parker for his community promotion work in Hobart, and the Wildcatch Fisheries SA – Complete Seafood Experience 2011, which was part of the SA Port Festival.

The People Development Award was a joint affair, shared by Samara Miller,

from the Australian Southern Bluefin Tuna Industry Association and Tony's Tuna International, based in Port Lincoln, SA. They worked together to match staff skills in the tuna industry with nationally recognised vocational qualifications and career pathways, providing a model for other sectors of the seafood industry. Runners-up were Rural Training Initiatives, which runs the National Seafood Industry Leadership Program, and the Tasmanian Shellfish Enterprise Diploma program.

The industry's 2013 Young Achiever was Ben Cameron, who is general manager of his family's shellfish hatchery, Cameron of Tasmania, which provides about half of the national oyster industry spat. The award recognises his leadership role working with several groups to improve oyster and shellfish-related research, disease management, quality assurance and strategic planning for the seafood industry.

SA rocklobster fisher Emily Rowe and NT teenager Elspeth Davey, who lives and works on her family's Spanish Mackerel (*Scomberomorus commerson*) fishing boat in the Gulf of Carpentaria, were runners-up.

A collaborative research project between the Australian Southern Bluefin Tuna Industry Association and the University of

Tasmania won the Research, Development and Extension Award. The project, funded by the FRDC, has helped to reduce the mortality of farmed Southern Bluefin Tuna (*Thunnus maccoyii*) by 13 per cent, adding an estimated \$20 million to the value of the industry.

Runners-up were Janet Howieson, a senior researcher with the Centre of Excellence for Science, Seafood and Health, and the Tasmanian Abalone GIS Team working with the Institute for Marine and Antarctic Studies and the Tasmanian Department of Primary Industries, Parks, Water and Environment.

The gala awards night also marked the launch of the National Seafood Hall of Fame, with 32 previous state or national seafood ambassador awardees inducted. The Hall of Fame has been created to recognise and record the contributions of the seafood industry's leaders and innovators. Seafood Industry Icons – the winners of the Ambassador Award – are named every two years as part of the Seafood Directions Conference.

A permanent Seafood Directions website (www.seafooddirections.net.au) will house the details of the icons, who exemplify the very best of the industry, as nominated by their peers. **F**

HUMBLE SARDINE GETS A MAKEOVER

Careful preparation and a passion for the product have been crucial in the development of new markets for an old fashioned favourite.

The humble sardine – once used for bait or pet food – is now making it onto the best restaurant tables in Australia, thanks to the passion of Western Australian fisher Tim Rowe.

Previously a wetline fisher and seafood processor based at Esperance and later at Geraldton, he has sold up these operations to focus solely on sardines. And he has been supported in his efforts to raise the profile of Australian Sardines by research conducted in conjunction with the Australian Seafood Cooperative Research Centre (Seafood CRC) and Curtin University to improve the supply chain and shelf life of sardine products, and to develop new market-ready products.

Cape Le Grande Australian Sardines now sells raw, frozen sardine fillets and lemon-flavoured, panko-crumbed frozen fillets to chefs in WA and cafes in Sydney and Melbourne. As managing director of the business, Tim Rowe is excited to see the product is “taking off”.

“At our processing factory in Geraldton where we used to process our so-called ‘prized’ species such as West Australian Dhufish, snapper and groper, we also used to get pallets of frozen sardines as bait for the fishers,” he says.

“Occasionally I would get the staff to fillet some of the sardines and cook them for lunch. They tasted great and I just loved them. I thought that if we handled and processed them with the same care as we did our expensive fish, they would taste even better.

“I kept on thinking that one day I was going to value-add these sardines and make them popular. I want to change the perception that people have of sardines as being smelly things in a can that old people eat.”

In 2000, he bought a sardine-fishing quota in WA’s south-coast fishery and, along with another quota owner, launched Cape

Le Grande Australian Sardines.

The next port of call was Janet Howieson at the Curtin University Centre for Excellence for Seafood, Science and Health. Janet Howieson helped Tim Rowe

access Seafood CRC funds to investigate product handling and development, and worked closely with him on developing rigid supply-chain protocols. As with all good product development, it has required

Researcher Janet Howieson has helped Tim Rowe of Cape Le Grande Australian Sardines develop new products that add value to the humble sardine.



PHOTO: CATHERINE NORWOOD



The raw Australian Sardine fillets appeal to creative chefs in high-end restaurants.

patient experimentation, quality assurance systems and an accurate understanding of the customers' needs.

"Working together and with value-adding through co-contribution between Cape Le Grande, Catalano Seafoods and the Seafood CRC funds we spent more than a year refining the transportation and processing to ensure that every step of the pathway from boat to consumer was optimised for quality," Tim Rowe says.

As the fish school on the surface under moonlight, purse-seine nets scoop them from the water and they are pumped straight from the net into an ice slurry. They are filleted at 0°C before being put into a blast chiller. Sardines have a comparatively short shelf life, so strategies to maximise this have been an important part of the project.

All fish begin to deteriorate as soon as they are harvested. Janet Howieson's research identified enzymes released by the sardines almost as soon as they hit the decks of the trawlers that accelerate this process.

This is why there is an emphasis on putting the catch into icy slurries as quickly as possible – the first two minutes are crucial. Sanitisers added to the ice slurries have also been shown to reduce the naturally occurring bacteria and extend shelf life. Data loggers were used in tracking the temperature and the condition of fish from harvest through processing and retail distribution.

Tim Rowe says it is crucial to maintain the fish from the boats in the best possible condition. "There is no 'magic fairy' in the chillers that will improve the quality of the fish – what you put in is what you get out. We have developed a great relationship with a small group of WA professional fishers, who ensure a strict temperature-control regime immediately after harvest and during transportation to the factory for filleting and packaging."



Josh Catalano of Catalano Seafoods with fresh Australian Sardine fillets.

He says the Cape Le Grande Australian Sardines have a distinct flavour, enhanced by their natural environment of very cold water off the WA coast.

"The supply chain is excellent – we are 'target fishing' for the premium food service/retail market, which has been a shift in harvest practice for a fishery that has traditionally targeted the bait market."

Tim Rowe says the investment in the research process has been invaluable and given him the confidence to invest in a processing machine from Sweden – the world's best sardine-filleting machine – which is now installed at the Catalano Seafoods factory in Bassendean.

Catalano Seafoods provides the contract processing for Cape Le Grande products. These include raw, frozen fillets, sold in 200 or 500-gram retail trays and a four-kilogram carton (eight 500-gram trays). Crumbed fillets are sold in five-kilogram packs, which provide portion control for restaurant kitchens. But the supply chain does not end at the wholesaler.

"It's very important to work with retailers or provide them with information to optimise their displays and maximise shelf life," Tim Rowe says. "For example, we've found that in-store cooking demonstrations at Catalano Seafood retail stores have yielded amazing results, boosting average sales from 20 cartons to 90 cartons."

He says he has also invested time in understanding the needs of the restaurant trade. The easy-to-cook crumbed product is very popular with cafes, while the raw fillets appeal to creative chefs in high-end restaurants. There are two crumbed products: one is flash fried, which allows for either oven frying, pan frying or grilling, while a different crumbed offering allows for deep frying.

"It's good to have the variety of products but you need to ensure when restaurants



The easy-to-cook crumbed Australian Sardine product is very popular with cafes.

want to reorder that distributors are well-stocked – you can kill the fickle food market very quickly if you can't supply."

Curtin University surveyed chefs during the development phase, to understand their preferred forms of the product, including product weights and information they required to make purchase decisions for their menus.

This research provided information on products, the supporting promotional material and strategies undertaken by Cape Le Grande during the launch phase. A subsequent follow-up survey with chefs who had tried the sardines found that many responded positively to the launch, which had been developed based on feedback from earlier surveys.

"There has been an excellent response to the convenient 500-gram portion packs, which have enabled chefs to trial them without lots of wastage," Tim Rowe says.

The crumbed fillets were also praised by chefs. Survey respondents said fillets worked well in the deep fryer, had great flavour and texture and the crumb was "nice and crunchy". Another respondent said they "loved the big fat, juicy fillets" from Cape Le Grande.

There are still a few challenges to overcome, mainly from consumers who are still coming to grips with the oilier, strong flavour, the small bones and the traditional perception of the canned variety. However, converting the opinion-making chefs has been a major first step to market success.

"In places such as Spain, Italy, Portugal, Greece and the Baltic countries, the sardine is a prince among a wide range of seafood and practically on every restaurant and tapas bar menu," Tim Rowe says. "Once people understand that they are also incredibly healthy, with high levels of omega-3 and vitamin D, there is no limit to the potential of this product." **F**

FRDC EXPANDS ITS ROLE

In the past six months the operating environment for the FRDC has changed significantly. Amendments to legislation have been proposed that would allow the FRDC to expand its role. At the same time Seafood Services Australia (SSA) has closed.

The FRDC has already taken on the delivery of several new services, and if amendments to the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act) are passed, it may take on more.

Marketing and promotion

Proposed changes to the PIERD Act would allow Research and Development Corporations to add marketing and promotion initiatives to their activities.

The amendments were first introduced to Federal Parliament on 19 June 2013 as the *Rural Research and Development Legislation Amendment Bill 2013*. Although it passed through the House of Representatives, it was still

before the Senate when the Prime Minister called the federal election, which means the legislation has not yet been passed.

However, foreshadowing the proposed changes, the FRDC is moving to put in place the processes and resources necessary to carry out marketing and promotion activities.

These kinds of activities will be entirely dependent on the amendments being re-introduced and passed by Parliament, and then on the interest of industry groups in pursuing them. Marketing activities will require the collection of funds from sectors wishing to participate.

Trade and market access

The announcement in July that SSA was closing meant a number of key FRDC projects would require transitioning to new organisations. The FRDC has taken direct responsibility for

the management of the Seafood Market Access and Trade Forum and the trade databases, including:

- food microorganisms;
- contaminants;
- food additive database;
- export tariff and duties database;
- detrainments of Australian seafood;
- trade issues database;
- Codex for comment; and
- trade statistics database.

The FRDC will deliver trade and market information and services to stakeholders, and Simon (Song) Liu, who worked with SSA, has been engaged to provide advice and update the trade data for the FRDC website (www.frdc.com.au/trade).

As part of the transition, some users will have noticed the FRDC has implemented fundamental changes to the previous SSA databases and websites to ensure they comply with government regulations, such as the privacy and accessibility guidelines. This has included asking all subscribers if they wish to continue to receive trade information.

The FRDC has also been speaking with key partners, including the Department of Agriculture and the Department of Foreign Affairs and Trade, and SafeFish, to review all current trade and market access activities to identify ways to improve the delivery of services. This has led the FRDC to look at the structure and design of some of the databases and implement several small changes. Further changes to the Seafood Market Access and Trade Forum may take place in the future and the FRDC will keep all users up to date as these occur.

To keep abreast of trade issues, the FRDC's communications manager Peter Horvat has been appointed to the Department of Agriculture Export Consultative Committee and the SafeFish Committee. He will also join the Australian



Maya Puglisi



Just some of the seafood on offer at the 2013 Savour Australia event in Adelaide.

Seafood Cooperative Research Centre Seafood Trade Access Group, which was formed largely to improve trade with China. The FRDC’s participation will help reduce duplication in the work that is being undertaken.

Setting standards

The FRDC has been approved by the Accreditation Board for Standards Development Organisations as a Standards Development Organisation (SDO), a role previously undertaken by SSA.

The driver for becoming a SDO was to ensure continuity of the Australian Fish Names Standard.

The FRDC is recognised as a reliable source of knowledge within the fishing industry and is sufficiently resourced to carry out standards development work within the scope of accreditation, within a reasonable time frame.

Being an International Organization for Standardization, the FRDC was able to prove it has sound administrative procedures in place, but will also have to demonstrate impartiality and neutrality throughout the standards development process. The FRDC’s executive director Patrick Hone says

this accreditation will allow the FRDC to develop Australian Standards in terminology, sustainability and operational practices in the fishing industry.

“This is an important achievement for the FRDC, as it becomes one of only five organisations accredited to develop Australian Standards and the only one able to do so within the food industry,” he says.

Standards are published documents setting out specifications and procedures designed to ensure products, services and systems are safe and reliable, and consistently perform the way they were intended to. Standards establish a common language, which defines quality and safety criteria.

Standards can be guidance documents including Australian Standards, International Standards and Joint Standards, Codes, Specifications, Handbooks and Guidelines. These documents are practical and set achievable goals. They are based on sound industrial, scientific and consumer experience and are constantly reviewed to ensure they keep pace with new technologies. Standards cover everything from consumer products and services, construction, engineering, business, information technology and human

services to energy and water utilities, the environment and more.

The FRDC will be able to implement standards based on the latest fisheries research, to encourage a greater uptake of the most responsible, science-based fishing procedures. The funds the FRDC spends in developing new standards could potentially be recovered through accreditation fees, with any additional money recovered reallocated to more fisheries research.

More information is available at the Standards Australia website (www.standards.org.au/StandardsDevelopment/What_is_a_Standard).

Fish names

The FRDC inherits an already-developed standard, the Australian Fish Names Standard (AS5300), from SSA. To maintain this existing standard, the FRDC will form a committee to assess any requests for changes or additions to Fish Names.

The Australian Fish Names Standard was approved by Standards Australia as an official Australian Standard in 2007. It aims to prescribe a standard fish name for each species of fish produced or traded in Australia. At the moment, it includes close to

SAVOURING AUSTRALIA'S FINEST

Establishing partnerships with other players in Australia's food and wine industry is becoming an important part of the FRDC's education and public awareness strategy. This has included participating in the 2013 Savour Australia wine festival held in Adelaide in September.

Savour 2013 was one of the biggest wine forums held in Australia. The four-day business event was held from 15 to 18 September and brought together over 700 wine, food, retail and restaurant people from across the globe – for China, UK/Europe, the US and Asia.

Wine Australia sourced local seafood and other produce for event lunches and dinners to help showcase the wines on offer. It provided an opportunity for the FRDC to help educate international and domestic visitors about Australian seafood.

FRDC communications manager Peter Horvat says the culmination of the seafood experience was the grand tasting and providores market on the last day of the event. "We worked with more than a dozen seafood industry suppliers and producers from across the country to deliver the five separate tasting experiences for the delegates," he says.

The five tastings included:

- prawn tasting (wild and farmed Tiger Prawns, farmed Banana Prawns and wild east-coast King Prawns);
- horizontal sashimi tasting (Atlantic Salmon, Albacore, Yellowfin Tuna and three cuts of Southern Bluefin Tuna);
- Pacific Oysters (Coffin Bay and Smoky Bay);
- Australian Blue Mussels (Port Lincoln); and
- trout caviar.

The seafood was presented very simply, allowing its quality and flavours to show through. The team, including FRDC executive director Patrick Hone, took the delegates through each of the tastings, explaining



the differences between species, cuts and origins.

"They were amazed by differences in the seafood, between species, and regional differences. Most delegates to the event had never tried the variety of seafood in one place, let alone done a tasting of the same category of prawns or tuna and Atlantic Salmon," Peter Horvat says.

"John Susman and his Fishtales team did an excellent job for the FRDC managing the on-ground logistics. The event was a huge success for seafood. Wine Australia and the international and domestic visitors left the show excited about the combination of Australian wine and seafood."

Options for the future

The goal for the FRDC was to build a strategic partnership with Wine Australia to open up new opportunities for seafood producers and also tell the story that Australian seafood is sustainably managed and responsibly harvested, and is backed by sound research.

Participation in this event has gone a long way to achieving this, and Wine Australia has offered the FRDC opportunities to participate in its international and domestic activities.

This includes two Wine Australia events in China (Hong Kong and Shanghai). The FRDC is now working with Wine Australia in-country teams around the world to try to match Australian seafood and wine companies and events.

More information: Seafood sectors or businesses interested in finding out more are invited to contact Peter Horvat, 02 6285 0414, peter.horvat@frdc.com.au.

5000 Australian and imported species, mostly finfish, but plans are in place to add more crustaceans, molluscs and sharks.

A searchable online fish names database (www.fishnames.com.au) includes all species listed in the standard. Users can find a fish by name and check its previous or non-standard names, as well as seeing an image in some cases.

The current standard specifies that fish sold to consumers, for example retail sales and restaurants, must be identified by their standard fish name; and fish sold other than directly to consumers, for example, wholesale, export and import, must also be identified by their standard fish name or scientific name.

This increases consumer confidence in the seafood product purchased as standard names

allow for more effective fisheries monitoring and management, which in turn results in greater sustainability of fisheries resources. Traceability and food-safety management can also improve with more efficient seafood marketing campaigns, and increasing industry profitability.

Having a standard in place also allows more efficient and effective management

of food safety and reduces the potential for misleading and deceptive conduct as more accurate trade descriptors can be used. **F**



More information: Heather Brayford, 08 9482 7370, heather.brayford@fish.wa.gov.au;
Daniel Gaughan, 08 9203 0156, daniel.gaughan@fish.wa.gov.au;
Guy Leyland, 08 9432 7777, gleyland@wafic.org.au

Gascoyne leads WA's sustainability gap analysis

A pre-assessment for the first of Western Australia's four fisheries bioregions has been completed, as the state begins the process of achieving environmental sustainability certification for its entire wild-catch seafood industry.

The WA Government, supported by the Western Australian Fishing Industry Council (WAFIC), has allocated \$14.5 million over four years to assess WA's commercial fisheries for third-party certification under Marine Stewardship Council (MSC) guidelines.

Guy Leyland, industry project leader at WAFIC, says many of the state's 46 individual commercial fisheries in the four bioregions are multi-species and multi-gear. To assess each individually would present logistical, capacity, resourcing, procedural and policy difficulties.

The bioregional 'pre-assessment' approach is an innovative world first for MSC assessments. Daniel Gaughan, supervising scientist for the assessment process, says it is more pragmatic to assess all the fisheries in one region simultaneously.

"The pre-assessment process is essentially a detailed gap analysis against the MSC certification criteria. We're rewriting how we've traditionally done business and the assessment will be more comprehensive because we're using an ecosystem-based approach, which considers all fishing effects on the broader ecosystem within a region while accounting for the target stocks for each fishery," he says.

The pre-assessment of the Gascoyne region of WA has been completed and the assessors will provide the results to the industry in the region in the near future. Pre-assessments for the North Coast are scheduled from October 2013 to February 2014, for the West Coast from December 2013 to April 2014, and for the South Coast from May to September 2014.

Guy Leyland explains that once a bioregion has been pre-assessed, individual fisheries in the area will need to decide if they wish to enter full assessment. This decision is voluntary.

"While government will pay for the costs of assessment for full MSC certification and the initial audit, fisheries will be responsible for ongoing costs. They will need to weigh up the costs and benefits of entering into the MSC program," Guy Leyland says.

"For some fisheries, improvement programs will be required to bring them up to a point where they can be confident that they would successfully pass assessment for full MSC certification," he says.

The full assessment process has rigorous requirements for stakeholder involvement that exceed those required during a pre-assessment. To achieve MSC certification, fisheries are assessed against 31 performance indicators under three principles: the target stock, the ecosystem effects and the management system. Once certified, a fishery is audited annually and must be assessed for recertification every five years.

MSC certification is recognised as the 'gold standard', providing the world's highest measure of fisheries sustainability and environmental performance.

Guy Leyland says WAFIC fully supports the government's choice of the MSC as the means to provide credible assurance of the performance of WA fisheries to the community.

"One outcome will be enhanced public confidence in the sustainability of WA fisheries and greater confidence among consumers that the seafood they are purchasing is sustainably fished. It will also assure a range of stakeholders that WA's commercial fisheries are well managed, which will help secure access to markets. This includes the opening up of new markets, encouraging business and market innovation and promoting the formation of commercial partnerships through the supply chain, as well as encouraging regional investment," he says.

Heather Brayford, deputy director-general at the WA Department of Fisheries, describes the move to seek independent certification of all WA's fisheries as one of the most significant reforms in the commercial fishing sector.



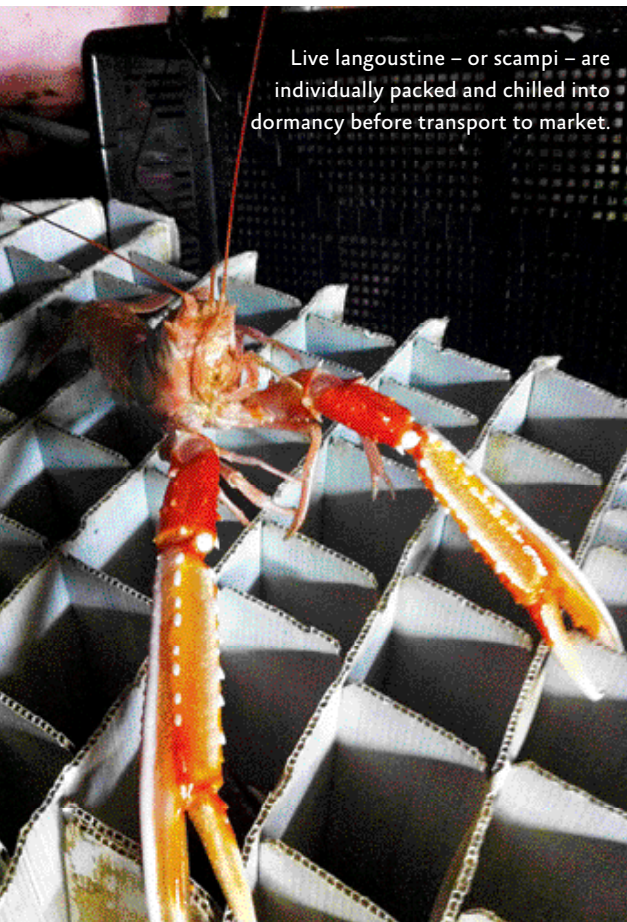
The map defining the four WA bioregions to be pre-assessed under MSC assessment guidelines.

"Reform is driven by demand from interest groups, the retail sector and the broader community for commercial fisheries to demonstrate their sustainability credentials. Increasingly, audit and certification of fishery performance and sustainability through third-party processes are becoming features of public accountability," she says.

"Major retail chains with seafood procurement policies – both overseas and in Australia – seek to source seafood from third-party-assessed sustainable fisheries."

Heather Brayford says two key priorities for the industry are securing long-term fishing-access rights and the independent verification of the current governance of fisheries, which will help build community support. She says the program is groundbreaking and "will shift the way we think about, and do business in, fisheries management". **F**

Scampi example prompts live prawn review



Live langouste – or scampi – are individually packed and chilled into dormancy before transport to market.

PHOTO: CLINT SCHARFE

improve on the 80 per cent survival rate over 24 hours previously achieved; a 95 per cent survival rate was determined as the viability benchmark in the original trial.

During his travels Clint Scharfe visited the McKinnon family, fishers on the Isle of Skye, who had been able to develop a premium, niche market for live langoustines (*Nephrops norvegicus*), also known as Dublin Bay prawns or Norwegian lobster, and served to diners as scampi.

The langoustines are trawled in the conventional way in water 100 to 500 metres deep off the coast of Scotland, although for the live market fishers use creel pots. The small fleet on the Isle of Skye has perfected the art of live capture and transport of the crustacean, which is sold into Europe. The live product has attracted a premium price, which has also increased the value of fishing licences.

The live langoustines are stored and transported in tubes and plastic dividers in the storage crates prevent damage and cannibalism. During transport the water temperature of crates is reduced from 8°C down to between 3°C and 5°C to trigger dormancy, which significantly reduces mortality.

Australia was successfully exporting live farmed Kuruma Prawns to Japan in the 1980s and 1990s, transporting animals in chilled wood shavings. At its peak, prices reached \$300 per kilogram, before the market crumbled in the face of disease and falling prices. A decade on, Clinton Scharfe believes further investigation of opportunities for live, wild-caught King Prawns are worth considering.

In addition to the Scottish scampi fishery, he investigated the benefits

of environmental accreditation in overseas markets, and new technology for the prawn industry.

With the price of prawns falling in the past 15 years, he says every effort is needed to add value to their product. As an active supporter of the Spencer Gulf Prawn Fishery's Marine Stewardship Council sustainable certification, he says this is one investment he is confident will pay dividends.

Following certification in 2012, the fishery has received increased inquiries, particularly from Europe, where environmental accreditations are strongly supported. Clinton Scharfe reports that the Belgian seafood company Setraco replaced non-certified scallops with an environmentally accredited product, which resulted in increased sales at a 30 per cent higher price, when there was otherwise little difference between the two scallop suppliers.

"For this very reason, Setraco agreed to meet and discuss the possibility of a relationship with Spencer Gulf King Prawns sourced from SA," he says. But there will also need to be a greater focus on marketing and differentiating the Australian product in international markets.

He says he quickly realised during his travels that Australia's fisheries management was second to none, and that a global system of labelling was needed to accurately identify both products and country of origin. This would help to further enhance and protect the reputation of Australian seafood, including high standards of sustainability, quality and food safety.

As part of his scholarship, Clint Scharfe also visited a Danish company that manufactures a continuous cooker, which could be used on board a trawler. The equipment was "very impressive and has good potential, but there would need to be a more regular demand for cooked prawns.

"At this stage, most of the demand is pre-Christmas and at Easter, when consumers are looking for the ease of pre-cooked product. The rest of the year, the demand is for green prawns." ■

The live export of King Prawns should be revisited, suggests FRDC-sponsored Nuffield Scholar Clint Scharfe, whose scholarship travels included a visit to Scotland's Isle of Skye where a premium trade in live langouste – or scampi – has been developed.

Clint Scharfe is a third-generation prawn fisher from South Australia's Spencer Gulf, and says the technology on board trawlers has advanced significantly since the original live King Prawn trials were undertaken in 1999 and 2000. Fishers in the Spencer Gulf also have a far more detailed knowledge of the fishery today than they did a decade ago, which may help them target prawns specifically for live export, he says.

With new technology on trawlers and in transport, he believes it should be possible to

An international travel scholarship has helped South Australia's Clint Scharfe research new opportunities for Spencer Gulf King Prawns.

More information: Len Stephens, len.stephens@seafoodcrc.com

Seafood CRC begins rebid campaign

Next year, 2014, was scheduled to be the last year of operation for the Australian Seafood Cooperative Research Centre (Seafood CRC). However, a one-year extension has been granted, allowing the Seafood CRC to celebrate its eighth birthday and providing more time to prepare an application for a new Seafood CRC.

The successful extension is welcomed as good news, as participants' and government funds held by the Seafood CRC are 96 per cent committed but only 80 per cent spent. The extension year will cover this gap, allowing projects to be completed in an orderly manner. The Seafood CRC will work with those participants who still have significant funds to commit to ensure the funds are used to good effect.

Looking to the future, the extension year will also allow the Seafood CRC to submit a new application to continue beyond 2015. The 'rebid' will cover pre and post-harvest research activities and will be open to existing and new participants.

The overall aim of the rebid will be to form a Seafood CRC with participants who hold a common vision on major research

opportunities to create new ways forward for the seafood industry. Existing participants may wish to continue some of their research activities, as well as proposing new initiatives.

New participants in the post-harvest area will be encouraged, as will new participants in aquaculture and fishing. Small industries and companies will be urged to contribute through consortiums with similar businesses.

The task of building a bid is enormous and we have to start now. If the new Australian Government follows the same procedures as previous years, it will announce priorities for new Seafood CRC bids (round 17) in February 2014 and applications will be due by mid-June 2014. Successful applicants will be advised in December 2014, with funding to commence on 1 July 2015.

The Seafood CRC, together with the FRDC, is preparing an investor's prospectus. To enable us to do this, we will undertake a range of consultative activities over the coming months. These will include workshops and individual meetings with potential participants to identify who is willing to invest and the nature of their research, development and extension questions.

Current Seafood CRC themes will also be assessed to determine if there is interest in continuing some activities to ensure participants maximise their existing investment.

The prospectus must be completed before the end of December 2013 for circulation to all potential investors. Organisations wishing to participate in the rebid will then be requested to provide up to \$10,000 to help in the preparation of the application, which can cost upwards of \$150,000.

It is anticipated the new Seafood CRC will have a total cash budget of at least \$10 million per year. The convention in Seafood CRC bids at present is that the Australian Government provides about half the funds required, which offers a considerable incentive for industry investment in research.

To discuss participation in the Seafood CRC rebid contact Len Stephens (len.stephens@seafoodcrc.com). **F**



Greater access to fish safety information

A new website has been launched to improve access to research reports and general information about seafood safety.

The SafeFish project, and the related website, is an initiative of the Australian Seafood Cooperative Research Centre in conjunction with the former Seafood Services Australia and the South Australian Research and Development Institute.

One of the initial aims of SafeFish was to provide technical support to Australia's negotiation positions in CODEX, the commission established by the Food and

Agriculture Organization of the United Nations and the World Health Organization to develop internationally consistent food handling and safety standards.

Since it was established in 2009, SafeFish has produced risk assessment reports that have helped to open or reopen markets for Australian seafood.

The same reports provide evidence for Australia's seafood safety claims – an important issue for our major trading partners, and can be accessed directly from the website.

Cath McLeod, who has served as chair of

SafeFish since its inception, has now stepped down from the role. She worked tirelessly on behalf of the seafood industry to ensure that decisions were based on sound science and, where there were information gaps, she created research teams to fill those gaps. Alison Turnbull has taken on the role of chair from Cath McLeod.

For more information on SafeFish or to download publications and reports go to the website (www.safefish.com.au). To discuss a particular technical food safety or trade issue contact Alison Turnbull (alison.turnbull@sa.gov.au). **F**

KINGFISH STAR IS RISING

A commitment to research has helped Clean Seas overcome developmental setbacks on the path improving Yellowtail Kingfish production.

A sleek torpedo-shaped finfish described as ‘the bullet of the sea’ has become one of the latest success stories on the Australian aquaculture scene.

Yellowtail Kingfish (*Seriola lalandi*) is a circumglobal species living in temperate waters of the Pacific and Indian Oceans. In Australia it ranges from North Reef in Queensland around the southern coast to Trigg Island in Western Australia, and is a highly regarded recreational sports fish.

Yet it has taken South Australian company Clean Seas to successfully pioneer the propagation, husbandry, harvesting and marketing of farmed Hiramasa Yellowtail Kingfish from facilities on and offshore of the Eyre Peninsula.

The company’s research into fish propagation dates back more than a decade and was initially focused on Southern Bluefin Tuna (SBT) (*Thunnus maccoyii*). Clean Seas chief executive officer Craig Foster says Yellowtail Kingfish were an early, experimental diversification along the path to SBT propagation.

With some early success, subsequent diet and disease issues led to high economic loss in the kingfish program. Clean Seas then embarked on an ambitious R&D program in partnership with the Australian Seafood Cooperative Research Centre (Seafood CRC) and the FRDC, which led to a tremendous improvement in both health and productivity. So much so that the company has changed its medium-term business focus to kingfish and suspended its SBT propagation program.

Craig Foster says the most critical aspect of R&D was determining dietary requirements for kingfish. A recent breakthrough has highlighted the importance of taurine in the grow-out diet.

Clean Seas also suffered an unpredictable fingerling supply due to jaw deformity and was producing two fingerlings for every one sent to sea.

“Researcher Bennan Chen led the investigations into resolving jaw deformity in juvenile kingfish. Bennan and his team identified the cause, and we now produce one fingerling for every one that goes to sea,” Craig Foster says.

“The outcome of our R&D was that we went back to basics, to the understanding that fish health and the productivity of fish is fundamental to the profitability of the business.”

At Clean Seas the journey from fertilised kingfish egg to a marketable four-kilogram fish takes 18 months. A selective breeding program produces fertilised eggs at the company’s Arno Bay hatchery in SA. As far as possible the breeding environment replicates that of the ocean, to encourage reproduction.

The eggs are placed into incubation tanks to hatch into larvae, which are then raised into fingerlings before their release into sea cages in the Spencer Gulf. Grow-out occurs in tensioned nets designed to maximise water flow, minimise fouling and protect the developing fish from predators such as seals.

Biomass growth is cyclical through the annual growth and harvest cycle. Optimal growth occurs when water temperature is in the range of 18°C to 25°C, with most growth occurring during summer.

“Our selective breeding program was established with research support from the Seafood CRC. We now produce all fingerlings from selectively bred broodstock.

An ongoing breeding program should see improvement in productivity at our sea farms.” The company’s infrastructure has the potential to support production of up to 6000 tonnes of kingfish a year.

The FRDC is a substantial investor in the Seafood CRC, which has, since 2003, funded a range of projects leading to improvements in Yellowtail Kingfish larvae and juvenile supply and quality, improved hatchery production of larvae and fingerlings, and commercialisation strategies for Yellowtail Kingfish genetics.

Craig Foster says focusing on feed and improvements in fish husbandry have delivered outstanding results. Kingfish survival, health and growth rates are better than they have ever been and there has been no return of feed or disease issues that have plagued breeding efforts in recent years.



Craig Foster,
chief executive
officer at
Clean Seas.



Incubation tank at Clean Seas hatchery where eggs hatch into larvae and develop into fingerlings.

The way forward for Clean Seas Yellowtail Kingfish production: healthy fingerlings.

Ninety-one per cent of this year's fingerlings survived compared with the 2012 survival rate of 47.2 per cent. Biomass growth is on track to expand production from the current 500 tonnes a year to reach profitable production levels of 1500 tonnes in 2015.

In 2008-09 about half of the company's kingfish production was exported, but more recently 90 per cent of product has been sold in Australia and 10 per cent in Europe. "In future, we'd like an equal split between the domestic and export markets, as we had before," Craig Foster says.

He defines Clean Seas' competitive advantages as uniform production, ability to service markets all year round and good-quality, good-sized fish. Demand from Europe is counter-cyclical and this fits in well with production for domestic markets. Clean Seas is also a market leader for fingerlings, exporting 20,000 to Europe in 2012.

When Clean Seas was first publicly listed in 2005, it was a production-led company producing more kingfish than demand required. The 4000-tonne production in 2008-09 sold for \$7 per kilogram. Now, with



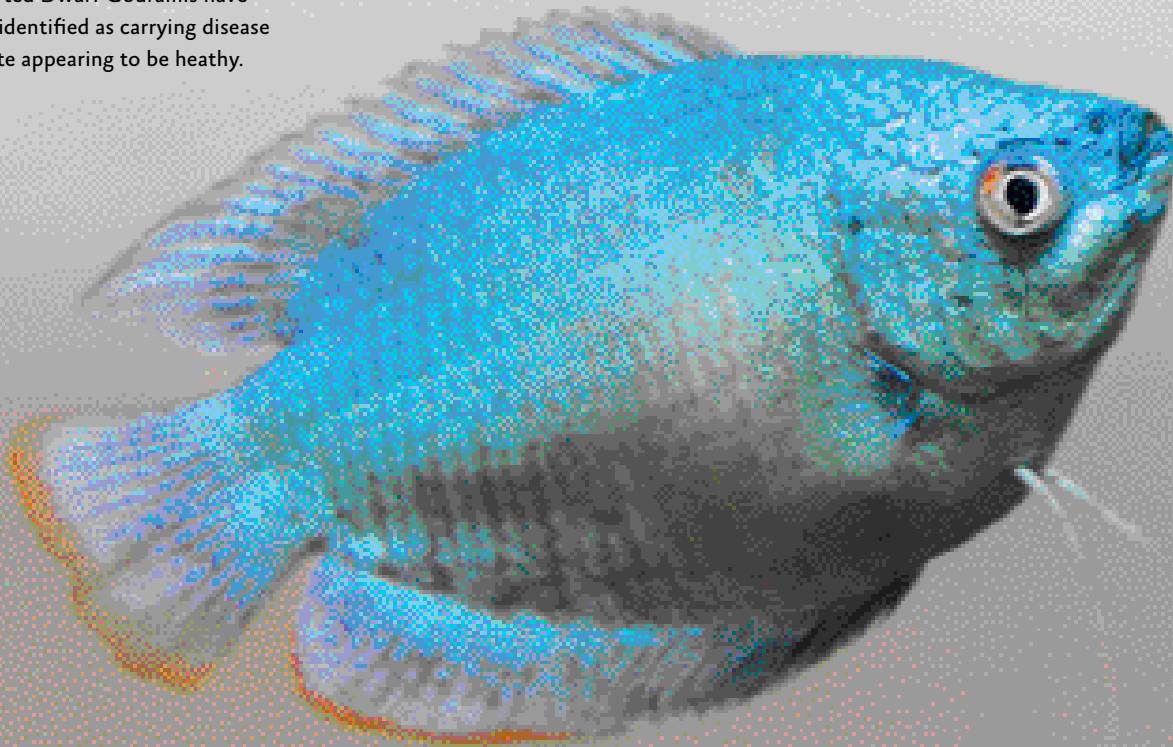
new markets in place, it has become market-led and achieves a 'farmgate' price of \$14.50 per kilogram whole weight.

The company has established markets for premium-grade sashimi Yellowtail Kingfish in Australia, Asia, the US and Europe and also for high-end, 'white tablecloth' restaurants in Sydney, Melbourne and Europe. Demand for

Yellowtail Kingfish exceeds supply and the success of the business has had a flow-on effect for wild catch.

"When we first entered the market, wild-caught kingfish was selling for \$5 or \$6 per kilogram but by expanding our market we have highlighted the species, repositioning it in the marketplace and it now sells for \$16 to \$17 per kilogram." **F**

Imported Dwarf Gouramis have been identified as carrying disease despite appearing to be healthy.



PHOTOS: 123RF.COM

THE DARKER SIDE OF EXOTIC ORNAMENTAL FISH

Millions of beautiful ornamental fish are imported each year and, despite strict quarantine measures, some might be also importing diseases that threaten domestic fish species and industries.



Exotic ornamental fish are a popular pet and desk accessory, but there is a darker environmental side to these often brilliantly coloured creatures.

In recent years, exotic ornamental fish diseases have been implicated in several mortality events among native species such as the Murray Cod (*Maccullochella peelii*), and have also caused serious problems for domestic producers of ornamental fish such as Goldfish (*Carassius auratus*).

While quarantine procedures exist for imported ornamental fish, a recent research project led by Joy Becker, from the University of Sydney, suggests that many diseases are slipping through the net and escaping into Australian waterways.

Australia imports about 18 million ornamental fish each year, says Joy Becker, senior lecturer in aquatic animal health and production. And every fish must comply with Australia's import conditions, including a health certification from the point of

origin. The fish are also subject to quarantine for varying lengths of time depending on the species, with Goldfish quarantined for 21 days and Dwarf Gouramis (*Trichogaster lalius*) for 14 days.

The aim of quarantine is to allow for the detection of any pathogens that might be latent in the fish; however, Joy Becker's research suggests that some significant exotic diseases are able to remain at a subclinical level for much longer.

"It can be difficult to detect them during the quarantine period; either the incubation period is much longer, or there has to be some sort of stress event that occurs for the fish to go from being a subclinical carrier – basically just harbouring the pathogen – to becoming overtly sick and being able to release the pathogen.

"However, sick fish are identified during quarantine and not allowed in the country, so it does work," Joy Becker says.

Using highly sensitive molecular diagnostic techniques, Joy Becker and colleagues recently examined the presence and prevalence of two notifiable diseases – the dwarf gourami iridovirus and cyprinid herpesvirus 2 – at all levels of the ornamental fish industry.

"We looked at fish coming in from overseas and then we looked at different populations of fish that are already in Australia at pet shops, ones that had just come out of quarantine at wholesalers, and then ones that were domestically produced in aquaculture farms and then finally in the wild," she says.

The research identified both viruses in a range of species, in different parts of the industry. In the case of the dwarf gourami iridovirus, it was detected in about 20 per cent of otherwise healthy Dwarf Gouramis imported from overseas and under quarantine and up to 15 per cent of fish released from quarantine to wholesalers. The virus was found in almost 30 per cent of sick Dwarf Gouramis at pet shops and it was also found at one domestic fish farm.

Cyprinid herpesvirus 2 was also found on wholesaler premises and fish farms, and was even detected in several populations of wild Goldfish.

"It's a really clear demonstration of how we can get an ornamental fish virus that's

exotic into the country and then from pet stores and pet owners, it gets into the wild," Joy Becker says.

Cyprinid herpesvirus 2 affects Goldfish, causing high levels of mortality, and is an issue for the domestic Goldfish aquaculture industry, but it does not affect any other species or people.

The dwarf gourami iridovirus is of much greater concern because it not only affects the popular Dwarf Gouramis but has also been responsible for mortality events among farmed Murray Cod.

"The dwarf gourami iridovirus infects several species. Right now it's considered a freshwater pathogen but there's evidence that it can infect species that are estuarine, as well as marine species, so that just increases its scope for the number of hosts it can impact on," Joy Becker says.

Vulnerabilities to exposure

New South Wales Goldfish producer Steve Wood says cyprinid herpesvirus 2 is a major issue for him. He is a director of the Pine Creek Fish Hatchery at Bonville, on the NSW north coast, a business that has been breeding ornamental fish, and Goldfish in particular, for more than 80 years.

It is a point of pride for the hatchery that the operations and fish are free of pests and diseases.

However, he says the lack of exposure to exotic diseases also makes them highly vulnerable when they are exposed; this is in contrast to imported fish, which seem to have built up some level of immunity through exposure to pathogens.

"If we put our fish in an aquarium that's got cyprinid herpesvirus 2 coming in, they will die pretty quickly." He says his business has lost customers because his fish have died when mixed with others in fish tanks at pet shops.

There is little hard data on exactly how these viruses are spreading and escaping into the wild, but Joy Becker says the source is unlikely to be individual pet owners.

"Your home aquarist putting tank water down the drain is not going to be the issue; it's going to be places where you have a lot of fish and you have that potential for pathogen amplification, so that could be a pet shop or a wholesaler or even a domestic farm," she says.

One scenario for release is simply a large amount of water from these venues entering the wild. Another, rarer scenario might be a tank break that releases fish into the wild. The suggestion has also been made that feeding ornamental fish to farmed fish may be another route of transmission.

"It does raise the other issue of people releasing pet fish into the wild, which is a big 'no-no'," Joy Becker says. "The water is probably a lower risk from a home aquarium but a human putting a fish back into the wild, that would create a higher risk."

The other issue is how to prevent these diseases from entering Australia in the first place. Since the release of these findings, quarantine authorities have accepted that cyprinid herpesvirus 2 is present in Australia and have revoked the requirement for imported Goldfish to be certified free of the disease.

However, the challenge is prevent or limit the entry of other diseases, including the dwarf gourami iridovirus.

"From the research that we did, we made some recommendations that have included diagnostic testing or veterinary health certification for the dwarf gourami iridovirus to be considered offshore, so then we know the fish arriving at the border are free of dwarf gourami iridovirus," Joy Becker says.

Other options include increasing the quarantine period for certain species, with the aim of detecting subclinical disease that might emerge after longer periods of time, or increasing surveillance and mandatory testing of consignments offshore to ensure they are free of disease before they arrive in Australia.

Steve Wood says he believes ornamental fish should be subject to the same entry procedures as any other imported animals. "If you brought 100 sheep in and 10 died, the other 90 wouldn't get released," he says.

Joy Becker is now planning a large study examining all of the currently notifiable diseases associated with ornamental fish and using molecular diagnostic methods to look for the presence of any of these diseases in ornamental fish entering the country.

"It's all protecting Australia's industries, whether it's aquaculture industries, fisheries industries or ecological industries," she says. **F**

SOURCE: THOMAS WELSBY, 1905



Snapper fishing on the Brisbane River and Moreton Bay waters.

News story on Spanish Mackerel from a 1982 edition of *Fishing News*.

Fishing for the past

To put contemporary fishing trends into a longer-term context, researchers are mining the memories of Queensland fishers and trawling through 140 years of historical records.

While fish-landing statistics in Queensland have been collected since the 1940s, they only provide an indication of what was caught and processed and do not include many of the other forms of data available such as fishing reports in newspapers or magazines.

The introduction of individual logbooks in 1988 has provided more detailed information in recent years about the where, when and how of harvests, but longer-term data is seen as critical to the success of future fisheries management.

Details of past catch rates, average fish size and changes in the marine environment can be used to improve future stock-assessment models.

Longer-term perspectives can help reduce uncertainty when projecting historical catch levels and historical fishery

trends can provide valuable information to help improve management strategies.

Ruth Thurstan and Sarah Buckley at the University of Queensland have embarked on the challenge to piece together a more detailed picture of the state's fisheries history.

To do so, they are interviewing experienced fishers, both young and old, and scouring old newspapers, archival records from the Queensland Fish Board and local fishing communities, focusing on two iconic Queensland fish species: Snapper (*Pagrus auratus*) and Spanish Mackerel (*Scomberomorus commerson*).

"We're hoping to provide insights from the past and a context for the trends we're seeing today," Ruth Thurstan says. "If we can also produce good-quality, high-resolution data, then we might be able to help inform stock-assessment processes by

sharing our research with managers and fishing communities."

A 2009 stock assessment declared Snapper to be 'overfished', making it a perfect candidate for the project. The species had been popular for decades, much longer than the existence of landing statistics. Offshore Snapper fisheries records date back to the 1870s when it became a popular recreational pursuit.

Spanish Mackerel also has a long history as a popular target for fishers along the east coast of Queensland. This transient species spawns in the north, near Townsville, and migrates south to the New South Wales border. While other species are also worthy of attention, focusing specifically on two species became essential to make the project manageable.

Landing statistics gathered by the Queensland Fish Board (replaced by the Queensland Fish Marketing Authority) offer insight into the numbers caught and processed, but they rarely tell the whole story. Archival sources, by comparison, allow researchers a window into 19th and 20th-century fishing practices, while interviews with different fishers help flesh out observations from the more recent past.

Assisted by the FRDC, Ruth Thurstan and Sarah Buckley have travelled across Queensland interviewing current and retired commercial, recreational and charter fishers.

The breadth of interviews has evolved over the past year, as fishers suggest new leads for interviewees and locations.

At the same time, the researchers are sifting through microfiche reels of archival material, from newspaper extracts and articles to fishing club records and even personal records. Several online digitised sources have proven valuable, as have local history archives, offering information not as widely known.

Ruth Thurstan says since the late 1990s archival sources have been recognised as increasingly valuable in generating historical trends, largely due to a surge of interest in the marine environment and a dearth of available data. The difficulty in placing contemporary trends into perspective, when faced with a lack of long-term knowledge, has led researchers to investigate a wider variety of sources.

Similarly, fisher recollections have proven valuable in a growing number of studies, she says. While not yet a common approach, interviews have been used in the US and the UK in the field of historical ecology.

“They’re all incredibly valuable pieces of information. We thought that if we used as many data sources as possible, then it would be a good way to gather this information and get people involved.”

Ruth Thurstan says archival material does raise certain challenges. Researchers must be aware of bias when interpreting each source. Even the reporting of fish catches in newspapers, a seemingly reliable historical source, can reveal a level of uncertainty when studied more deeply.

“Are they reporting average catches or are they actually representative of what was being caught or perhaps even an overestimation?” Ruth Thurstan asks. “I don’t doubt that the numbers of fish they said they were catching are correct, but it might be that they weren’t reporting the poor catches, only the good catches.”

One strategy to mitigate the murky influence of bias is to use as many different data sources as possible and comb for trends across a large and varied sample size. The challenge then is to find a way to link these together and form a timeline of the fisheries.

Some archival sources have already revealed riches. Extracts of Snapper catches from the 1870s record landings of Snapper by the hour, by the fisher or by the boat.

To date, more than 300 individual sources have provided catch rates for a particular period and location – up to seven decades prior to the start of landing statistics that show only overall landings.

The project aims to sample geographically as broadly as possible and to speak to as many fishers as time allows. The study of Spanish Mackerel spans as far north as Cairns and encompasses the major population areas south to the NSW border.

The Snapper research is focused from Brisbane to Gladstone, where significant catches have been known to occur. The study could potentially continue south into NSW as these fish are part of the same Snapper population. This would provide a picture of the wider trends along the east coast; Snapper are at the northern-most

point of their range in Queensland waters.

As the project unfolds, other factors may be considered, such as the impact of development along the coast and changing environmental conditions.

Ruth Thurstan says the response to the project, to date, has been positive. Fishers have been happy to participate and have understood the need for information.

The researchers plan to share their findings with the participating communities next year. Once the data is released and has been analysed, discussions can begin about how to incorporate this into fisheries management.

“We’re not looking for anything in particular, because we don’t really know what’s there, until we find it,” Ruth Thurstan says. “When you don’t know what you’re going to find, that can be quite exciting.” **F**

“We’re hoping to provide insights from the past and a context for the trends we’re seeing today.”

– Ruth Thurstan

Ruth Thurstan trawling through newspapers in the State Library of Queensland.

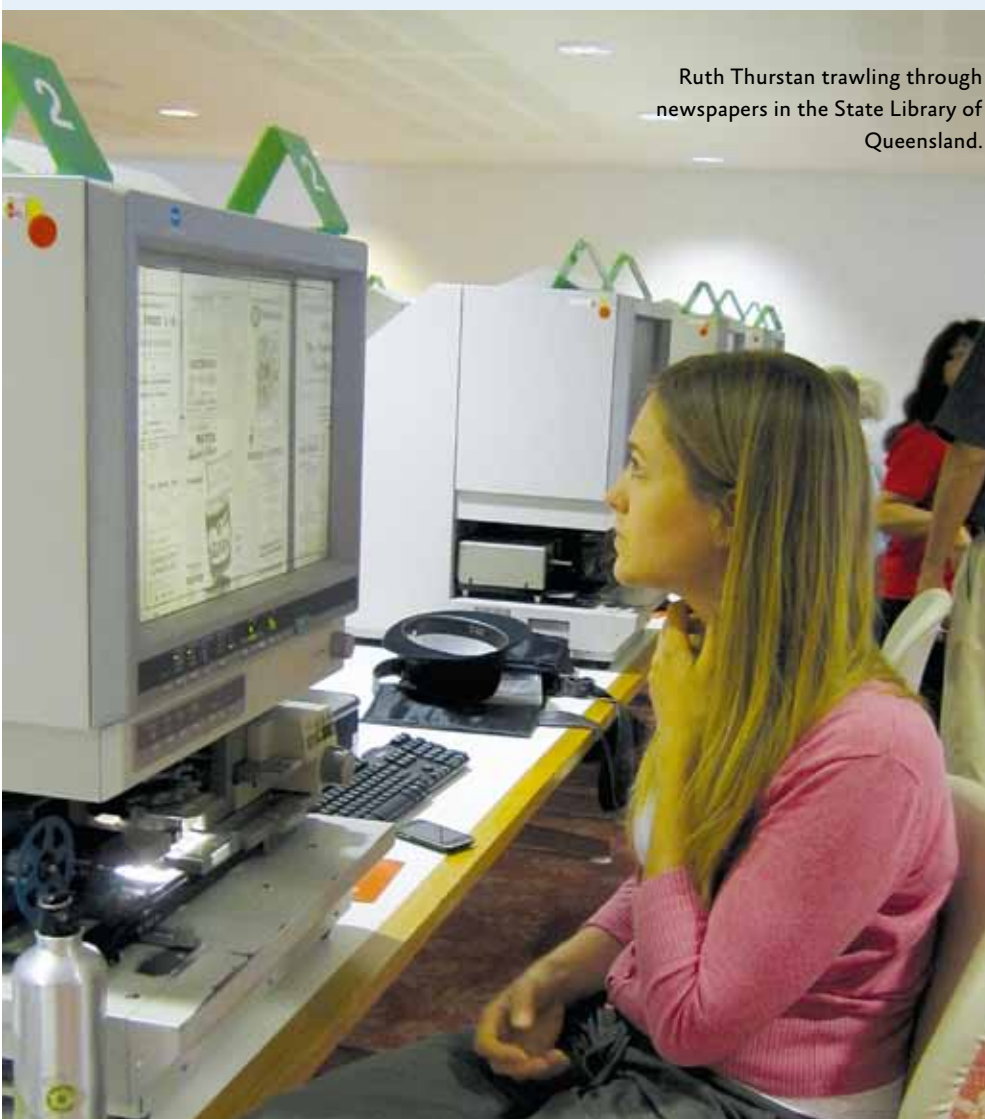


PHOTO: SARAH BUCKLEY

More information: Alison King, 08 8946 6754, alison.king@cdu.edu.au, <http://rii.cdu.edu.au/people/profile/alison-king>; National Environmental Research Program northern Australia hub, www.nerp-northern.edu.au

The Murray River at
Barmah–Millewa Forest.

FLOW-ON EFFECTS

It is easy to see how changes in river flows affect trees and waterbirds, but researcher Alison King has taken on the greater challenge of identifying the effects of a river's fish populations.

PHOTO: ALISON KING

Environmental flows have long been an important issue in the Murray–Darling Basin, one of the most regulated rivers on earth. In contrast, northern Australia is home to some of the world's last remaining unregulated river systems. However, ongoing interest in developing the north, particularly for irrigated agriculture, could see these rivers put under pressure unless any development is carefully managed.

Having studied the effects of environmental flows on fish in the Murray–Darling Basin for more than a decade, ecologist Alison King is now applying her insights and experience to Australia's northern waterways.

When the need for environmental flows in the Murray–Darling Basin was first raised in the 1980s and 1990s, there was little information about how they would work,

and how to achieve the best return from the use of the water, according to Alison King. She was part of a team of researchers from the Victorian Government's Arthur Rylah Institute for Environmental Research working to provide evidence on the benefits of environmental flows for fish in the Murray River.

Now there is a substantial body of work that is helping to finetune the delivery of these flows to maximise the ecological benefits, including her own five-year project focused on the Murray River and flows in the World Heritage-listed Barmah–Millewa Forest.

Her research in the forest from 2002 to 2007 included much of the Millennium Drought period. In 2005, an environmental flow of 513 gigalitres was delivered to the Barmah–Millewa Forest, on the Victorian–New South Wales border, east of Echuca. The flow was delivered over three

months, from October to December. The environmental flow allowed Alison King and her team to examine the significance of flows for spawning and recruitment, comparing drought and more 'normal' water flow patterns with environmental flows.

"It was the first time we have been able to demonstrate that environmental flows were having positive outcomes for native fish," she says.

She was part of a technical committee providing advice to the Murray–Darling Basin Authority to optimise environmental flows at Barmah–Millewa Forest for improved ecological outcomes.

"We were able to design the flow to target fish spawning, and we got the response we wanted. We found that quite a few fish species responded to the flood conditions. Golden Perch (*Macquaria ambigua*) and Silver Perch (*Bidyanus bidyanus*) were the two main

species, and significantly increased their spawning activity during the environmental flow.” She says pulses in the delivery of the environmental flows seemed to help trigger spawning. The fish did not spawn as soon as flooding began; warmer temperatures and repeated rises in flow were important.

Other species such as Trout Cod (*Maccullochella macquariensis*) and Murray Cod (*M. pealii*) showed improved recruitment following flooding of the forest region as a result of the environmental flow. Alison King says it is likely the flooding provided access to more food and suitable rearing habitats, helping more young fish to survive.

Benefits from the environmental flows were also reported for other flora and fauna, such as waterbirds and vegetation. “All in all, when you looked at a whole-of-ecosystem perspective, the environmental flow was seen as very successful.”

She says there were several presentations to local communities about the research findings. “Many locals love and enjoy the forest and the river, and can see benefits in the flourishing wetlands and trees, where the water birds come in en masse and breed and trees turn green again; these are obvious things. It is a lot harder to identify what is happening with fish because you can’t see under the water. So the research was able to tease some of that information out and explain it to the community.

“We also learnt a lot about the balancing act of environmental flows and flooding, as recent events have highlighted there are some ecological risks associated with inundating floodplains.” These include increasing the breeding of exotic species, most notably European Carp (*Cyprinus carpio*) and Oriental Weatherloach (*Misgurnus anguillicaudatus*); and increasing the potential for a ‘blackwater’ event.

When the Millenium Drought finally broke in 2010, she says up to 2000 kilometres of river were affected by black water – stained by tannins leaching from accumulated organic matter on the floodplains. The organic matter was rapidly consumed by microbes, depleting the water of oxygen and making it difficult for many fish to breathe and resulting in widespread fish and Murray crayfish deaths. She says the rebuilding of both fish and crayfish

populations will be largely reliant on recruitment and migration of animals from outside the affected areas and could take many years.

In 2012, Alison King joined Charles Darwin University as a principal research fellow. In this role she is working as part of a team in the National Environmental Research Program’s (NERP) northern Australia hub and is now investigating how different types of flow in northern Australian rivers affect various tropical freshwater species.

Northern Australia’s rivers are still largely in their natural state, but ongoing interest in developing the north could see the environment competing with other water users. Alison King is using her experience in the Murray–Darling Basin to address environmental flow questions in northern Australia, specifically how flows influence recruitment, total abundance and key life-cycle attributes of several fish species. This information will help inform future water planning with the intent of protecting key flow components to maintain current ecological condition.

“We’re interested in a range of fish species, such as the iconic Barramundi (*Lates calcarifer*), and those that are important to Indigenous communities such as Sooty Grunter (*Hephaestus fuliginosus*) and catfish species, and also smaller-bodied species with no recreational importance, such as rainbowfish and archerfish, which are an important part of the ecosystem”.

“The diversity of fish species is much higher in the north than in the southern rivers, and we are missing even basic biological information about many species. It is likely that land and river management may change, and we are trying to get more information about how important flow is so we can manage and reduce any potential impact on the environment.”

Alison King’s research is focusing on the Daly River, while other aquatic researchers in the NERP northern Australia team, which includes David Crook, Michael Douglas and Stuart Bunn, are focusing on movement patterns of fish in the Alligator Rivers region in Kakadu National Park.

“We think water extraction will mostly affect the dry season flow – the lower



PHOTO: ZEB TONKIN

Alison King with a large Murray Cod.



PHOTO: ALISON KING

From the northern rivers a male Mouth Almighty (*Glossamia aprion*) breeding his eggs.

flow period. But we know little about its ecological importance for fish. The wet seasons appear to drive the ecosystem, so we are also investigating how important the preceding wet season is, or the one before that, to the resilience of fish during the dry season. We want to know where fish go across the range of flow conditions, what areas they use and why, and what they need to reproduce and survive.”

There is so much to learn, and fish research in the north, she says, is really just getting started.

Alison King presented an overview of her work to the Australian Society for Fish Biology’s annual conference, as the winner of the society’s 2012 Early Career Excellence Award. The conference was held in New Zealand in August in conjunction with the New Zealand Freshwater Sciences Society and the New Zealand Marine Sciences Society. **F**



Biosecurity 'seatbelt' for salmon producers

Huon Aquaculture's 'all-in' approach to biosecurity has earned the company national recognition.

Biosecurity is an integral part of the business for Huon Aquaculture, protecting its own operations and the industry in general.

Frances Bender, co-owner of the Tasmanian fish farm and processing business Huon Aquaculture, says her land-farming friends are astonished when they hear she has a veterinarian on permanent staff. Their assumption is that the vet looks after sick fish, but that is not the case. "It's to make sure the fish don't get sick!" she says. "It's about being proactive, not reactive."

Frances and Peter Bender's commitment to protecting the health of their farm was recognised at the annual Australian Farmer of the Year Awards on 12 September 2013. They were awarded the Biosecurity Farmer of the Year Award in the animal category, becoming the first aquaculture business ever to win the award.

The Biosecurity Farmer of the Year Award is sponsored by Farm Biosecurity, a joint initiative of Animal Health Australia (AHA) and Plant Health Australia (PHA).

Biosecurity is the set of measures that are taken to protect a farm (or region) from the entry and spread of pests and diseases, and to prevent the spread of any disease, pest or parasite that does enter the area.

Duncan Rowland, executive manager of biosecurity services at AHA, says Huon Aquaculture stood out from its competitors for several reasons. One was their whole-of-chain biosecurity plan, which makes biosecurity “everybody’s business” and central to its operations. Another was the extensive work the company does to raise the profile of biosecurity issues in the industry and broader farming community.

“Biosecurity is about creating layers of protection at every level. It’s not just the government’s responsibility – it’s everybody’s responsibility,” Duncan Rowland says. “Peter and Frances’ approach is exemplary.”

Frances Bender says biosecurity has been central to their business model since they diversified from a family cattle farm to salmon and trout farming 25 years ago. “In an aquaculture operation, biosecurity can mean the difference between operating and not operating. Because once a disease or parasite gets into a body of water, there is literally nothing you can do to keep it out.”

She says overseas diseases and parasites have wiped out farms. “The worst example for me was in Chile, which had a thriving salmon-farming industry until infectious salmon anaemia disease went through the place. It was devastating: there were 25,000 direct jobs lost, in a country with no social security, no safety net. And all because of poor biosecurity practices.”

The waters of Tasmania are famously clean and pristine, and the Benders work diligently to keep it that way. Frances Bender says there is a perception that Australian farm produce will always be of high quality. “But it takes work to protect what we have and keep it that way. Even in Tasmania, the waterways certainly don’t take care of themselves.”

Proactive AGD management

The main health challenge for Huon Aquaculture is amoebic gill disease (AGD). AGD was first diagnosed in populations of Atlantic Salmon in Tasmania in the mid-1980s, and has since affected fish farms around the world. Symptoms typically start from two months after fish are transferred from hatcheries to sea pens and can recur throughout the growth cycle. The most

effective treatment involves transferring populations of fish into very large freshwater baths for two to three hours.

“AGD no longer causes any significant mortality and freshwater treatment is routine and low stress, but proactively managing it adds a lot to our production costs,” Frances Bender says. Worldwide, AGD is estimated to cost the industry US\$20 million (A\$20.9 million) in treatments and lost productivity. Norwegian salmon and trout farms are now taking a strong interest in the way Huon Aquaculture manages the disease.

Whole-of-chain plan

Frances Bender says that the learning curve involved in moving from a cattle farm to a fish farm has been “vertical”. But the basic principles of farming are the same: keep the stock well fed and stress free, and maintain the environment where stock live.

Today, Huon Aquaculture is one of three big salmon farms in Tasmania. It employs more than 450 staff in farming, processing and selling Atlantic Salmon and Rainbow Trout products to the domestic and international markets.

As the company has evolved, the biosecurity plan evolved with it. In 2012, the whole-of-chain biosecurity plan was put in place to cover all stages of fish production from the hatchery to the plate. The plan incorporates education and training, and implementing good fish husbandry through quality management, health monitoring, vaccine use and ongoing research.

Creating the biosecurity plan meant examining every process and transaction that staff undertook on a daily basis. This included looking at where the fish stocks came from, how they were introduced into the farm, how they have been managed in the past and how they are managed now. It also meant looking at details such as where the vehicles have been, and whether staff have been on other farms and areas where they could have been exposed to biosecurity risks.

“It comes down to a lot of little things such as disinfecting gumboots and diving equipment every single day,” Frances Bender says.

She says the biggest challenge in implementing the plan was educating new staff about the importance of biosecurity.

“Fortunately, our team has been very supportive. Also, we have some very experienced biologists and technical people across the business, and it’s part of their job description to manage biosecurity and keep looking for risks on a daily basis.”

Peter and Frances Bender are also involved in developing a state-wide comprehensive biosecurity plan that encourages collaboration between industry and government.

“We’ve been working with the Tasmanian Government and industry to develop very transparent and open communications about fish movements and possible risks,” Frances Bender says. “Because the lesson to be learnt from overseas is that if everyone doesn’t follow the same rules, everyone suffers. So we’re working very proactively to put good biosecurity practices in place in the west and south coast of Tasmania.”

Quality first

The Benders hope their business will continue to grow while maintaining its reputation as a premium producer. “The challenge is to make the business scalable without diverting our focus on quality.”

To that end, the company is working to find appropriate markets to expand into, and is looking at innovations that might allow them to farm in rougher conditions further out to sea. They are also working to continuously improve processes, which includes maintaining their British Retail Consortium accreditation (a gold standard of accreditation for food factories) as well as the European retailers standard for Good Agricultural Practices, which encourages sustainable agriculture and the minimisation of agrochemical inputs.

“We only pursue accreditation that has a meaningful improvement process that must be reviewed at least once a year to make sure we’re doing our job in the best possible way,” Frances Bender says. “It’s a waste of time to just get a certificate to put on the wall.”

She attributes the company’s success to a fastidious attention to detail and quality. The Benders view biosecurity practices as simply part of that commitment to quality. “It’s like putting on a seatbelt,” she says. “Eventually it makes sense to most people and just becomes routine.” **F**

Netting new leadership skills

Two weeks roughing it in the Kimberley was a world away from their roles in the fishing industry, but it laid the foundations for a journey Katherine Sarneckis and Kate Brooks will never forget.

Both were FRDC-supported graduates of the most recent round of the Australian Rural Leadership Program (ARLP), a 17-month initiative that equips participants with skills to advance and support their industries and communities.

They joined 27 other established leaders from a cross-section of industries, including farming, telecommunication, natural resource management, research, government and community engagement.

As the youngest-ever chief executive officer of the Northern Territory Seafood Council (NTSC), Katherine Sarneckis embraced the opportunity for professional and personal development and exposure to national and international issues affecting rural Australia.

She has been involved in the seafood industry since 2005, after moving from Adelaide to Darwin. By 2008, at just 29 years of age, she was in the top job at the NTSC, which represents 260 license holders in the wild catch, aquaculture, retail and wholesale sectors.

While some experiences were confronting – such as visiting rural India and meeting homeless people in Sydney – Katherine Sarneckis says the ARLP equipped her with leadership strategies she says will benefit her role in the industry.

“The ARLP gave me the confidence to recognise the value of what we are doing in the seafood industry, to step outside our traditional scope and to initiate new projects, such as developing a book to showcase the NT industry. The program also opened my eyes to new links with tourism, the community and other food industries.”

One continuing challenge is understanding her own ability, as a leader, to influence productive engagement with the community and to work with – not against – people.

“The seafood industry has strong science to support our activities, but facts alone are

not enough to gain community support. Exposure to other industries through the ARLP made me think about how we can sustainably promote our sector. I am now exploring new opportunities to engage and educate the community.”

Kate Brooks manages the FRDC’s Social Sciences Research Coordination Program, which identifies social and economic issues facing the seafood industry and works with researchers, industry and government to develop and deliver research projects aimed at providing solutions.

She says the ARLP exposed her to a multitude of experiences and ways of viewing the world, working with different people, solving problems and approaching challenges.

“My participation and experiences from the program have further developed my leadership style to be more enquiring, open and embracing of those around me and opportunities that may exist,” Kate Brooks says.

“I am using skills I developed through the ARLP to work with Australian and international researchers and agencies to improve how we integrate economic and social dimensions into the well-established ecological management practices of industry and government.

“Our ambition is to improve the Australian community’s understanding of how the industry operates and is managed, and their perceptions of the responsible stewardship of Australia’s aquatic and marine resources.”

Katherine Sarneckis and Kate Brooks both credit the ARLP with a better understanding of their own management styles, strategies for effective leadership, and skills such as influencing conversations to achieve positive outcomes. Kate Brooks says the ARLP has increased her confidence in her roles with the FRDC, the South Australian Fisheries Research Advisory Council and the New South Wales Marine Estate Expert Knowledge Panel. Katherine Sarneckis is also extending her leadership skills as she embarks on a new challenge as one of 16 NT business ambassadors.



Katherine Sarneckis is already using skills learned from her leadership program to improve seafood networks.



Kate Brooks in the Kimberley as part of her Australian Rural Leadership Program experience.

The ARLP does demand a large investment of time (59 contact days including an international trip plus individual study) but it is a learning experience both women wholeheartedly recommend to other established leaders in the industry.

The FRDC has sponsored 35 ARLP participants since 1993, as well as three participants in the Australian Rural Leadership Foundation’s TRAILblazers program. FRDC projects manager – research Jo-Anne Ruscoe says leadership development is an important investment that leads to improved personal leadership skills and therefore organisational, systemic and societal pay-offs in the longer term.

“The FRDC believes its investment in the ARLP develops people who have a greater appreciation of other rural industries and the opportunity to build partnerships in rural communities.”

Applications for course 22 of the ARLP open in February 2014. **F**

Facebook forums help track SBT survival

PHOTOS: IMAS



Southern Bluefin Tuna prior to being landed and tagged.



IMAS technical officer Amos Mapleston with a 90-kilogram-plus Southern Bluefin Tuna landed by Sean Tracey (background). The fish was tagged and released.

When fisheries scientist Sean Tracey checked his laptop one morning in July this year he discovered that two satellite tracking tags used in his Southern Bluefin Tuna (SBT) (*Thunnus maccoyii*) survival study were transmitting from a remote beach on King Island in Bass Strait.

He immediately logged into some Facebook recreational fishing forums with a request: “Is there anyone on King Island who can take a wander down to the beach and pick them up for me?”

Word spread through the fishing community and soon the tags were retrieved and posted to his office at the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania.

Sean Tracey says this is just one example of the cooperative spirit he has seen from stakeholders involved in his project to assess the impact of recreational fishing on SBT numbers.

“Australia is part of an international push to rebuild the SBT population, which was heavily overfished during the 1960s and 1970s,” Sean Tracey says. “We now have international cooperation to control overfishing in the commercial sector, but there’s a need to understand the impact that the growing game-fishing community in Australia has on stocks.

“Recreational fishers release many of the SBT they catch, either in response to bag limits or as part of a catch-and-release ethic.

Our job is to find out whether the fish that are thrown back into the water actually survive, and whether there are fishing practices we can recommend that will improve survival rates.”

Funding for the research has come from the FRDC, the Tasmanian Fishwise Community Grants Scheme, the Victorian Recreational Fishing Licence Trust and the New South Wales Recreational Fishing Trust. The project began in 2012 and is expected to end in early 2015.

The study hinges on tagging SBT that recreational anglers catch by rod and reel. The state-of-the-art tags are programmed to pop off when the fish dies, or after preset periods of up to 180 days. They float to the surface and relay data back to IMAS via the dedicated Argos® environmental satellite tracking system. The data includes the location of the tag as well as stored information about the temperature, depth and light conditions experienced by the tagged fish since its release. The data can then be used to determine the survival and behaviour of the tagged fish.

“Our challenge was to find and tag fish caught under typical recreational fishing conditions,” Sean Tracey says. “We were looking at things such as fight times and types of lures and lines used. We also needed to tag fish at different times of year, and at different points in their migratory path around Australia.”

So he reached out to the recreational

community through boat registration records, fishing clubs and social media. One of his best allies is Al McGlashan, the presenter of the television series *Big Fish Small Boats*.

Al McGlashan says he saw the value of the study immediately. “SBT are a big, impressive fish that are fun to catch. The problem is, once you feed them they’ll follow you all day so it’s almost too easy. Sean’s work seemed like a great way to spread the word about doing the right thing so we can keep enjoying this sport.”

The study was featured twice on Al McGlashan’s show, and recreational fishers started following the project on social media in large numbers.

“Fishers love social media – it should have been invented for us,” Al McGlashan says. “It’s been a great way to follow Sean’s study and to see where the fish we’ve tagged have ended up. It’s great to see researchers and fishers working together to make fishing a sustainable activity.”

So far, 45 tags have been deployed and Sean Tracey says the early results have been encouraging. “It’s easy to think: ‘This fish is bleeding and exhausted so there’s no point in throwing it back.’ But we’re finding that some fish with quite bad hook injuries do in fact survive after release.”

He says he could not have performed the study without the support of the recreational fishers. “I hope it continues, because we have 15 more tags to deploy next year.” **F**

More information: Bass Sydney Fishing Club, www.basssydney.com;
Fish Habitat Network, www.fishhabitatnetwork.com.au

BASS ANGLERS TAKE UP HABITAT CAUSE

Recreational fishers are helping to revegetate river banks with native plants and improve fish passage along their favourite riverine reaches.

In 2003, the environmental organisation Greening Australia approached the Bass Sydney Fishing Club to help restock native fish in South Creek, part of the Hawkesbury–Nepean catchment.

But the Parramatta-based club had a different idea. Rather than putting more fish in the water, why not improve the habitat for those already there? Remove the pest plants that interfere with fish feeding, and improve the migration channels that have been interrupted by weirs and barrages.

The club has about 40 members who fish rivers and creeks along the coast of New South Wales, primarily targeting Australian Bass (*Macquaria novemaculeata*).

The club's project officer, Alan Izzard, explains that instead of restocking, the group proposed revegetation with plants indigenous to the area. "About 40 per cent of bass food drops into the river, such as cicadas. So if the plants go, that food doesn't get into the water and the fish move elsewhere. Along the edges of creeks and rivers, where the riparian vegetation grows, that's a great place for the fish to hang out," he says.

"So Greening Australia invited us to put our muscles where our mouths were and do a planting. We must have planted a couple of

thousand trees and bushes on South Creek, and when the funding for that dried up, we went and did some work in National Parks on the Grose River, and also down on the Nepean River."

The catch-and-release club now holds monthly habitat revegetation working bees. These are focused on a reach of the Nepean River at Emu Plains in outer-western Sydney, a project funded by a Commonwealth Caring for our Country grant, and a NSW Recreational Fishing Trust Fish Habitat Action grant managed by the NSW Department of Primary Industries (DPI). Partnering with Greening Australia, McCarthy Catholic College, Penrith City Council and the Hawkesbury–Nepean Catchment Management Authority, since 2011 the club has helped to rehabilitate several hectares at the site, weeding out balloon vine, privet and lantana.

"All of the native casuarinas have been freed of weeds, and have sprouted back and look fantastic. We will replant other trees that are endemic to the area," Alan Izzard says. In addition to their revegetation work, since the 1990s the Bass Sydney Fishing Club has also worked with local councils, the NSW DPI and the NSW National Parks and

Wildlife Service to have artificial fishways installed on weirs at Lane Cove and on the Parramatta River.

As a prominent example of recreational fishers taking charge of the wellbeing of the environments in which they spend leisure time, last year the Bass Sydney Fishing Club won the inaugural Habitat Heroes Award at the National Recreational Fishing Conference held on the Gold Coast, Queensland.

The award is sponsored by the Fish Habitat Network, which was established in 2009 and draws together state bodies, non-government organisations, peak bodies, clubs and community groups for habitat rehabilitation.

Charlotte Jenkins, fisheries conservation manager with the NSW DPI (which coordinates the Fish Habitat Network), describes recreational fishers as the "eyes and ears of the river".

"There have been huge impacts on fish habitat in NSW since Europeans arrived, and because of that there have been dramatic declines in fish numbers, abundance and populations," she says.

"We realised that a lot of recreational fishers feel a need to put something back into that habitat, and that we could help

PHOTOS: ALAN IZZARD



BEFORE

Balloon vine rampant at the Emu Plains site that Bass Sydney Fishing Club are rehabilitating.



AFTER

The native casuarinas are exposed after five hours of vine removal at the Emu Plains site.

people engage with what is happening on the ground.” This kind of involvement of recreational fishers in environmental care builds on international experiences in North America, where the longer history of European settlement led to earlier manifestation of environmental damage. For decades, fishers on these continents have driven habitat care programs, with well-documented benefits. “All over the world you can find examples where riverine enhancement programs have had a benefit for invertebrates in the system, for fish in the system,” she says.

Riverland restoration

The Fish Habitat Network began in NSW but now operates Australia-wide, and supports projects that include: • weeding and revegetation; • improvement of fish passage; • pest control; • collaboration with local landholders for improved riverbank fencing; and • in-stream habitat enhancement such as re-snagging – hardwood native timber is placed into the waterway to replace woody structures that have been removed for reasons such as improving boat passage.

Fish Habitat Network staff are also an educational contact point for clubs, providing resources about the necessary environments for the animals to survive and thrive, through meetings, newsletters, the website and social networking.

A major focus for the network is fish passage through the weirs, barrages and causeways that characterise Australia’s river systems. “Many of our native fish species migrate to access habitat to breed and to find food, and fish passage barriers, such as road crossings and weirs, can have a real impact on their migration,” Charlotte Jenkins says.

Following the installation of new

fishways, recreational clubs are often involved in data collection, which contributes to the overall picture collated by government departments on fish numbers in their river systems. “For example, there was a fishway put on one of the weirs around Sydney, and the local fishers kept a log and provided that input back to scientists to show how catches upstream had improved,” she says.

However, as with most habitat restoration work that is focused on small parts of much larger river systems, the positive effects are often not immediately measurable in terms of fish numbers. Nor does revegetation project funding often cover the cost of monitoring for specific outcomes.

“The benefits of fishways can be swiftly observed in the migration of fish to parts of the river previously unavailable to them, but weeding and revegetation is a far slower process,” Charlotte Jenkins says.

“In Australia we have monitoring programs where we assess the health of a river. So in the longer term, the cumulative effect might show a benefit, but it’s very hard to show a complete spike straight away.”

Long-term effort

The Nepean River project at Emu Plains is no short-term hobby for the Bass Sydney Fishing Club, which plans to work on the site for the next five to 10 years. The club’s environmental focus has resulted in three members becoming bush regenerators, including club president Ashley Thamm, now a contractor with Bushland Management Solutions.

He explains that waterweeds such as Egeria densa and alligator weed in the Hawkesbury–Nepean river system are a major problem. “And balloon vine knocks out the canopy trees around the river system, so you get fewer snags (fallen branches and dead trees that create microhabitats) and insects coming into the river,” he says.

For Alan Izzard, whose love for fish has led to a passion for the environment, care for waterways is a simple matter of cause and effect.

“I consider rivers and creeks to be the veins and arteries of the land. If we let them die, the whole country dies. Riparian vegetation is not just food for bass, but it also acts as a filtration system and holds the banks together, as well as supplying important habitat for platypuses, birds and other creatures.”

REVITALISING AUSTRALIA’S ESTUARIES

Coordinator of the FRDC’s Climate Change Program Colin Creighton has completed a project that prepares an Australia-wide business case for restoring estuarine environments. His final report suggests a break-even return on a \$350 million investment over five years, based on increased fisheries productivity. Key commercial species in selected locations were assessed in preparing the business case. Additional benefits that might accrue from recreational fishing or from improvements to environmental elements, such as water quality, have not been calculated. The Murray–Coorong fishery in South Australia was evaluated, along with Sydney Rock Oysters, School Prawns and Mulletts in New South Wales and Banana Prawns and Tiger Prawns in Queensland.

FRDC Research Code: 2012/036

More information: Colin Creighton, 07 4958 4775



PHOTO: BEN PEARCE

An iconic recreational species, Australian Bass.



PHOTO: GEOFF LIGGINS

Tagging is part of efforts to monitor and rebuild the NSW rocklobster fishery.

COOPERATIVE COURSE FOR ROCKLOBSTER INDUSTRY

Stock assessments, new technology, biotoxin warnings and international marketing were all on the agenda for rocklobster industry participants attending the 8th Rock Lobster Congress in Sydney in September.

More than 230 rocklobster industry participants, researchers and fisheries managers from Australia and New Zealand gathered at Darling Harbour, New South Wales, in September for the 8th Rock Lobster Congress, to discuss challenges and future directions for the industry.

The event also incorporated the Trans-Tasman Rock Lobster Conference, the second time it has formally been held as a joint event with the New Zealand industry.

The exchange of information, ideas and aspirations aimed to streamline and accelerate stock rebuilding initiatives, improve industry productivity and enable greater efficiency gains in terms of research and compliance across the various fisheries' jurisdictions.

The theme of the 2013 congress was 'Meeting new challenges with confidence' – adapting to changing political priorities and preferences for access to and use of marine resources. It builds on the work of the 2011 Trans-Tasman Rock Lobster Congress, working with industry professionals to guide and inform industry responses to challenges and opportunities.

FRDC executive director Patrick Hone opened the proceedings, encouraging delegates

to share the vision to grow industry value. He gave a commitment from the FRDC to assist industry through a range of programs directed at supporting co-management, investing in people, promoting science, supporting industry partnerships and consolidating the FRDC as an even more efficient service agency.

Keith Sainsbury, professor of marine management systems at the Institute for Marine and Antarctic Sciences, paid tribute to the NSW rocklobster industry in his presentation 'A Management Success and Lessons Learned'. He said the patience and cooperation of the industry – the open and productive relationships between industry, science and fisheries managers – were critical to ongoing efforts to rebuild the NSW fishery. When faced with challenges to the resource, he said industry engaged constructively with the implementation of changes needed to address these challenges.

In the 'State of the States' segment, presenters highlighted current issues in their own fisheries. John Harrison, attending his first Rock Lobster Congress as chief executive officer of the Western Rock Lobster Council, outlined the challenge of cetacean interactions (whales, dolphins and porpoises) and possible responses from the Western Rocklobster (*Panulirus cygnus*) industry.

In a subsequent research and technology presentation, Geoff Liggins from the NSW Department of Primary Industries (DPI) and NSW rocklobster fisher Scott Westley presented a summary of field trials of sonar release buoys deployed in the offshore rocklobster fishery along the NSW coast. There was significant interest in these devices as a possible means of avoiding cetacean entanglements in rocklobster gear, but the current cost of the technology may prove to be a barrier to widespread use.

Picking up on the FRDC theme of growing industry value, Tim Ward and Rick McGarvey from the South Australian Research and Development Institute (SARDI) outlined the development and application of maximum economic yield approaches to rocklobster stock assessments.

Some delegates were concerned that fishery modellers have yet to properly understand the subtleties and complexities of the rocklobster fishing business. Tim Ward agreed that model design and projections could only get better as industry participants made more detailed and timely information available to researchers.

Two presenters from New Zealand took up the theme of industry-generated data and the manner in which it can be stored

PHOTO: GEOFF LIGGINS



(From left) Mal Gorry, Scott Westley and a crewman deploying deep water traps with sonar release from vessel *Spinaway II* on the NSW south coast – the new technology was featured at the Rock Lobster Congress.

and used. Jeremy Cooper from the Paua Industry Council showed electronic data collection technology developed for the New Zealand abalone and rocklobster industries, which is being used to collect information for stock assessments and to inform industry harvest initiatives.

Mark Jones from Commercial Fisheries Services Ltd explained how storage and access to industry-generated data could be both secure and cost-effective. He also explained related intellectual property, privacy and security considerations.

Day two of the conference began with a marine biotoxin management workshop convened by Alison Turnbull from SARDI. The session built on the closures experienced by the entire Tasmanian rocklobster fishery and a component of New Zealand's Bay of Plenty fishery in 2012 following biotoxin events.

This was followed by a 'Fishnet Forum', which brought together female managers from industry and state agencies in a discussion facilitated by Nici Gibbs, formerly a senior policy manager for the New Zealand seafood industry. Themes to emerge from the forum were the need for industry to be well organised, have proper mandate and demonstrate a willingness to engage consistently and productively with management agencies.

Perhaps one of the most graphic descriptions of challenges and how best to meet them came from SA delegates Joel Redman and Kyri Toumazos. The video presentation 'Drawing the Line' focused on the SA rocklobster industry and was developed in response to Australia's marine protected areas policies.

Wayne Hosking from Geraldton, Western Australia, gave another presentation contrasting the pragmatic observations and conclusions of the Western Rocklobster industry participants with the more theoretical management responses developed by the WA Department of Fisheries.

He concluded that the worst effects of historical management interventions on

industry may have been avoided if better communication and understanding had prevailed at the time.

Market value

Australian rocklobster fisheries generate a landed value in excess of A\$404 million, ranking as the most economically valuable of the Australian wild-catch fisheries. New Zealand rocklobster exports generated an estimated NZ\$220 million (A\$191 million) in 2012-13 and the rocklobster fisheries remain the most economically valuable of all New Zealand inshore fisheries.

The significant majority of rocklobster production from both countries is exported and the price paid to fishers for their catches is determined by the quality and status of Spiny Rocklobsters in the ever more competitive Chinese market. Two presentations again highlighted the capacity of the Chinese market to absorb an increasing tide of rocklobster products from the Americas, South Africa and Asia.

Positioning trans-Tasman rocklobster production as the premium luxury choice for wealthy consumers is part of the work being coordinated by the Australian Seafood Cooperative Research Centre, supported by the China Trade Reference Group.

Group member Nathan Maxwell-McGinn provided delegates with insight and advice on tapping into the hearts and minds of the most discerning consumers. Andrew Harvey from Ngai Tahu Seafoods provided an illuminating and perceptive account of doing business in China.

Feedback on the conference from delegates and speakers was positive and the organising committee was encouraged by the financial and other support of the two major sponsors, the FRDC and the NSW DPI, and from participating industry representative organisations.

These included the NSW Lobster Industry Association, the New Zealand Rock Lobster Industry Council, the Western Rock Lobster Council, the SA Rock Lobster Advisory Council and the Tasmanian Rock Lobster Fishermen's Association.

Several industry service providers also supported the event and set up colourful and informative trade displays.

The Western Rocklobster industry will host the 2015 event, which will be the ninth Rock Lobster Congress, and third Trans-Tasman Rock Lobster Industry Conference. **F**

Daryl Sykes is the executive officer of the New Zealand Rock Lobster Industry Council

MOVERS AND ...

MICHAEL HARTE is leaving WWF to return to Oregon State University as a professor in the College of Earth, Ocean and Atmospheric Science.

DALLAS D'SILVA has accepted the position of executive officer of the Victorian recreational fishing peak body, VRFish.

The New South Wales Minister for Primary Industries, the Hon **KATRINA HODGKINSON MP**, has appointed former FRDC director **RICHARD STEVENS**, from Queensland, as chair of the NSW Ministerial Fisheries Advisory Council, and also to co-chair the Northern Territory Recreational Fishing Advisory Council with the Hon **WILLEM WESTRA VAN HOLTHE MLA**, NT Minister for Primary Industry and Fisheries.

After three years as the CEO of the Commonwealth Fisheries Association, **TRIXI MADON** has decided to move on to other challenges.

The board of the Western Australian Fishing Industry Council has appointed **JOHN HARRISON** as its CEO from November 2013.

Regional Australia Institute CEO **SU McCLUSKEY** was named the *Australian Financial Review* and Westpac 2013 'Woman of Influence' working in regional Australia.

MOVERS WE'VE MISSED? INFO PLEASE TO

Julie Haldane, 02 6285 0415,
julie.haldane@frdc.com.au



MONITORING DISCARDS

2009/076

The Northern Prawn Fishery (NPF) will soon benefit from more efficient and cost-effective management arrangements such as streamlined quota monitoring and reconciliation practices thanks to the implementation of electronic monitoring. Using cost-effective monitoring programs and services is critical for an economically sustainable fishing industry. An electronic monitoring system was trialled for monitoring prawn discards in NPF, and provided a valuable insight into the functionality and applications of this technology in the fishery. The data collected was of sufficient quality and level of detail to meet the Australian Fisheries Management Authority's onboard monitoring requirements. Potential cost savings for industry were identified when electronic monitoring was compared with an onboard observer program monitoring 15 per cent of fishing effort. The break-even point occurs at approximately 10 per cent coverage; at five per cent, no cost savings were observed. Sensor and image data can be used to check the accuracy of the daily fishing logbook records, which would then improve information on catches and catch composition to assist decision-making.

More information: Matthew Piasente, 02 6225 5555,
matthew.piasente@afma.gov.au

RECREATIONAL FISHERS 'RATIONAL'

2009/081

A model of recreational fisher choice is used to assess the likely reaction by fishers to tighter management rules. Put simply, within this model, the fisher stays fishing until the net benefit from another hour fishing is balanced against the opportunity cost of the extra time, reflected by the value of doing non-fishing activities elsewhere. Overall, the survey results and associated analysis show a high degree of conformity with the model, suggesting fishers behave quite rationally in the choices they make about fishing in the presence of tighter management rules.

Emerging diseases on international agenda

Since Pacific Oyster mortality syndrome (POMS) was first detected in Australia in 2010 the disease has been the focus of urgent research to identify the causes and develop either control strategies or preventive measures for the Australian oyster industry.

The progress of this work was the highest profile topic of discussion at the Australasian Scientific Conference on Aquatic Animal Health held in Cairns, Queensland, in July, with an extended session on the issue.

The program for the four-day event also included sessions on finfish diseases, parasites, viruses and vaccines, crustacean health, amoebic gill disease, bacteriology, quality assurance, mollusc diseases, diagnostic testing and validation, education and training, and regulation.

Keynote speaker was Hugh Ferguson, professor of diagnostic pathology and microbiology at St. George's University in the West Indies, who discussed emerging international fish health issues in his opening address.

Hugh Ferguson said it was ironic that at the same time people were being encouraged to eat more fish to improve their own heart health, cardiovascular disease was an increasing fish health issue, particularly in farmed salmonids. He gave details of a variety of significant viral and bacterial diseases of finfish and also highlighted an increase in jellyfish blooms, which may act as vectors for

significant disease pathogens most likely to affect farmed fish.

The leader of the FRDC's aquatic animal health research subprogram, Mark Crane, was the conference coordinator and says the event provided an important networking forum for both experienced and early career researchers, as well as for students. The FRDC sponsored 33 students to attend and also provided awards for the three best student presentations. The award winners were Mark Blumhardt (University of Tasmania, supervisor Barbara Nowak), Alexander Brazenor (James Cook University, supervisor Kate Hutson) and Megan Stride (University of Tasmania, supervisor Barbara Nowak).

Mark Crane says the standard of presentations at the conference has continued to improve since the first national event was held in 2003. The 2013 conference is the second time it has been held as an international event. More than 120 delegates attended, including participants from Hong Kong, Malaysia, New Zealand, Denmark, Taiwan, Canada and Singapore.

Interest in the conference has grown as Australia's aquaculture industry has expanded and with the increase in aquatic animal health issues such as POMS.

FRDC Research Code: 2012/032

More information: Mark Crane, mark.crane@csiro.au

This project has developed a model of recreational fisher behaviour to explain how recreational fishers could be expected to react to changes in fishing regulations and has completed two surveys of recreational fishers (in the 2010 and 2011 seasons) to document changes in fishing behaviour as a consequence of the new fishing rules and the closed season for the West Coast Demersal Fishery. Results obtained have been compared with those from a previous survey of recreational fishers undertaken in 2003 when no such restraints existed.

Overall, the surveys revealed only modest numbers of fishers adjusting their behaviour, but satisfaction scores for fish caught, species caught, time to catch the fish (catch rate) and size were all significantly lower in the 2010 survey, consistent with the tighter bag limits and reduced catch under the new rules.

More information: Paul McLeod, 08 6488 2498, paul.mcleod@uwa.edu.au

SHARK STOCK STRUCTURE 2007/035

Four of the key exploited shark species caught in the Queensland inshore net fishery and northern New South Wales line fishery can now be managed with greater confidence as a result of this project examining the stock structure of north-eastern Australia.

The study determined that spatial management of Milk Shark (*Rhizoprionodon acutus*) within Queensland, and Scalloped Hammerhead (*Sphyrna lewinii*), Common Blacktip Shark (*Carcharhinus limbatus*) and Australian Blacktip Shark (*C. tilstoni*) within Queensland and NSW is appropriate. The results also indicate that both Blacktip Shark species are likely to require cooperative management arrangements between Queensland and NSW. For Scalloped Hammerhead, separate stocks between the two jurisdictions were identified from the fisheries-dependent samples. However, genetic exchange across borders is likely to be facilitated by movement of adult females and perhaps larger males to a lesser extent. This information will greatly assist compliance with the *Commonwealth Environment Protection and*

Biodiversity Conservation Act 1999 for shark fisheries in north-eastern Australia by providing the necessary basis for robust assessment of the status of stocks of the study species, thereby helping to deliver their sustainable harvest. It also helps to achieve objectives of the Australian National Shark Plan.

More information: David Welch, James Cook University, 07 4781 5114

CITIZEN SCIENCE ADDS TO REDMAP 2011/088

Redmap engages citizens to help record and track range-shifts in marine species using a website. Launched in December 2009 by Gretta Pecl at the Institute for Marine and Antarctic Studies at the University of Tasmania, Redmap has logged more than 400 sightings of 70 marine species in Tasmania alone, and registered more than 700 unique subscribers to the program. Due to its great success, Redmap is now being expanded to a national level and is expected to not only engage and educate, but also to promote awareness of local species and provide an early warning of species shifts around Australia. This project has increased the understanding of how climate change impacts on Australia's biodiversity.

More information: Gretta Pecl, University of Tasmania, 03 6227 7277

REDUCING THE IMPACT OF POMS 2011/053

This project will help ensure the sustainability and profitability of the aquaculture industry and the health of natural resources by providing new data on the epidemiology of Pacific Oyster mortality syndrome (POMS). Practical management measures based on raising the height of the growing platforms to reduce adult oyster losses due to POMS are possible but require confirmation through a second season of study because the summer of 2011-12 was unusually mild and wet. It is possible that POMS disease expression will be different in a typical hot, dry summer. This project helped industry to strengthen biosecurity practices: there were proposals from specific sectors of the oyster industry for voluntary restrictions on oyster movements between

CALENDAR OF EVENTS

DATE	EVENT	MORE INFORMATION
10 to 13 December	5th International Oyster Symposium, Ho Chi Minh City, Vietnam	www.worldoyster.org/index_e.html
28 December to 3 January	The Taste Festival, Hobart	www.tastefestival.com.au
2014		
9 to 12 February	Aquaculture America 2014, Seattle, US	www.marevent.com/AA14seattle.html
11 to 12 February	FRDC Board Meeting, Geelong/Queenscliff	02 6285 0400
23 to 26 February	65th Pacific Fisheries Technologists Conference, Monterey, US	http://pftfish.net
3 to 6 March	Fishery Dependent Information conference, Rome, Italy	www.imr.no/prosjektsiter/fdi/en
15 to 16 April	FRDC Board Meeting, Brisbane	02 6285 0400
2 to 6 June	2nd Sharks International Symposium, Durban, South Africa	www.sharksinternational.org
5 to 6 June	FRDC Board Meeting, Adelaide	02 6285 0400
7 to 11 June	World Aquaculture Conference and Trade Show, Adelaide	www.aquaculture.org.au
30 June to 4 July	Australian Society for Fish Biology and Australian Society for Limnology Joint Congress, Darwin	www.asfbasf.org.au
7 to 11 July	The International Institute of Fisheries Economics and Trades 2014 Biennial Conference, Brisbane	
26 to 27 August	FRDC Board Meeting, Canberra	02 6285 0400

estuaries, and objective laboratory testing of oysters for specific pathogens prior to movement to decrease the risk of disease spread.

The need for genetic selection to improve oyster health was addressed by the flow of data from this project to the POMS genetic selection program. Communication of the most recent findings of the project will be ongoing, including through a fully illustrated website, which was established during the project and has proven to be very popular with industry (www.oysterhealthsydney.org). This project was based on the premise that the oyster industry will need to learn to live with POMS by managing husbandry. It investigated the epidemiology of POMS during its second summer in Australia to identify factors that may be exploited to reduce the impact of this viral infection.

Different farming practices could have a role in disease management and help reduce mortality of adult oysters during a POMS outbreak. The pattern of infection and disease varied on different leases suggesting that underlying environmental factors influence disease expression. Differences in mortality among sites, ages and growing heights were evaluated in relation to the intensity and prevalence of viral infection and the environmental data recorded during the outbreak.

More information: Richard Whittington, University of Sydney, 02 9351 1619

PLANNING POMS RESPONSE 2011/043

This study tour of oyster farms affected by Pacific Oyster mortality syndrome provided information and contacts that should prove useful to the Australian oyster industry. However, the study team found a degree of inconsistency in opinion about the effect that different factors have on virus-related mortalities. This could mean that:

- the effects vary in different locations and/or environments;
- there are other important factors influencing survival that are unknown;
- the factors being considered have little impact on survival;
- observed differences are simply random variation; and/or
- farmers searching for a solution to this problem are using a trial-and-error method.

Research priorities identified included increasing selective breeding focus on developing virus-resistant family lines, establishing a series of trials to test the effect of different growing practices on mortalities and standardising protocols for testing for the virus within Australia. It was also recommended that the industry should complete a risk assessment and monitoring plan to track the incidence of the virus in Australia.

More information: Tom Lewis, RDS Partners Pty Ltd, 03 6231 9033

ACCESS TO ATLANTIS 2010/043

Fisheries managers often need to rapidly explore the possible effects of a range of potential changes to a fishery, such as changes in fuel or fish prices, environmental shifts (for example, climate change) or alternative fisheries management regulations. Like flight simulators, ecosystem models such as Atlantis can show what might happen if the environment changes or if managers make a decision to shift management of the fishery in one way or another. It can take years and cost millions of dollars to build models of systems as complex as any one of Australia's federal fisheries, which makes rapid assessment difficult. However, a group of existing ecosystem models, spanning a large number of potential management strategies and environmental scenarios, is being collated and made accessible via a user-friendly web portal.

In the short term, this web portal is based on runs set up for south-eastern Australian waters (the Southern and Eastern Scalefish and Shark Fishery), but other regions will be added to the library as models become available. Other data sources used by fisheries managers and the fishing industry could potentially be linked via the same portal.

A one-stop data portal for relevant fisheries information that includes the ability to interrogate complex information about marine systems and gain general insights into their function and implications of different forms of management would ultimately support sustainable management of Australia's fisheries and biodiversity.

More information: Beth Fulton, CSIRO Marine and Atmospheric Research, 03 6232 5018

COLLABORATION REDUCES BYCATCH 2009/069

The primary outcome of this project was the voluntary adoption from March 2012 of bycatch-reduction technology in the Gulf St Vincent Prawn Fishery. This was achieved through a collaborative research approach among key stakeholders that enabled rapid development and extension of a novel trawl gear combination. This resulted in a substantial reduction in total bycatch for the fleet, particularly for catches of megafauna, such as sponges, sharks and rays, and fish. The improved selectivity of the gear also facilitated a reduction in the capture of smaller, lower-valued prawns. As a consequence of reduced bycatch levels, fishers were able to increase tow duration during commercial fishing in 2012. This should enable increases in efficiency and total fuel consumption for a given trawl effort. These outcomes can be extended to other Australian fisheries through description of the collaborative approach to research and adoption and/or the novel use of T90 mesh plus grids developed for this prawn fishery.

More information: Cameron Dixon, SARDI, 08 8207 5436

EMS FOR BAY, INLET FISHERIES 2002/090

By developing an environmental management system (EMS), commercial fishers hope to address community concerns about the sustainability of their activities, increase support for their industry and better promote their role as seafood providers.

Victorian Bay and Inlet Fisheries Association (VBIFA) members began work on an EMS in late 2003 after winning FRDC funding and securing the assistance of a project officer, Pascale Baelde.

Developing an EMS is a voluntary, industry-driven environmental initiative. It is an approach that promotes industry self-governance and which is increasingly supported by governments. It recognises that commercial fishers themselves are in the best position to develop and implement best practices that meet both environmental and food production needs.

It also recognises that fishers' knowledge and expertise are assets to the community. VBIFA members developed their EMS collaboratively through a series of workshops facilitated by the EMS project officer. They followed well-established steps, including describing the fisheries, risk analysis, development of an action plan and implementation of a mechanism for regular performance review.

The VBIFA EMS covers the four major fishing methods (haul seine, mesh net, purse seine and demersal longline) allowed in Port Phillip Bay, Western Port, Corner Inlet and the Gippsland Lakes.

More information: Ross McGowan, Fisheries Victoria, 03 9329 5660

FISHERIES MODELLING AND ANALYSIS
2008/304

Ken Pollock was appointed to the position of professor of quantitative methodologies for natural resources to lead the project 'Establishment of self-sustaining facility for fisheries modelling and multivariate analysis, and for effective management of extremely large fisheries databases'. With advice from the project's steering committee he developed a package of training workshops for professionals and postgraduate students. These workshops were delivered by several people known internationally for their expertise in estimating mortality (John Hoenig), mark-recapture analyses (Ken Pollock), population modelling (Terry Quinn III) and qualitative modelling (Jeffrey Dambacher). The workshops have helped strengthen collaborations in Western Australia with John Hoenig and Ken Pollock in particular.

Ken Pollock collaborated with researchers at the WA Department of Fisheries on sampling designs and analysis for recreational fisheries, and with Murdoch University researchers and postgraduate students on sampling design and population estimation for marine wildlife. After two years, Ken Pollock returned to the US and the project was terminated. He maintains his collaborations in WA, particularly with Murdoch University and the Department of Fisheries, through his appointment as a Walter Murdoch Distinguished Adjunct Professor. This appointment provides funding for his travel to and expenses in Australia for one month a year from 2012 until 2014.

More information: Neil Loneragan, Murdoch University, 08 9360 6453

ROCKLOBSTER AQUACULTURE
1998/305

This project featured three different components. Component I investigated the effectiveness of different 'natural' and manufactured diets in maintaining/improving condition and in promoting growth at moult in adult Southern Rocklobster (*Jasus edwardsii*) held in sea-based and land-based systems. Trials were run from November 1998 to March 1999 (summer) and from April to November 1999 (winter) at industry facilities in Port Lincoln and on Kangaroo Island in South Australia.

These provided information on diets and feeding regimes, comparison of holding systems, the growth, mortality and biology of lobsters under long-term live-holding, and the product quality of live-held lobsters. Component II of the project investigated the effects of temperature, salinity and density/biomass on the growth and survival of juvenile Tropical Rocklobster (*Panulirus ornatus*). Component III of the project investigated the effects of temperature and photoperiod on the growth and survival of juvenile Southern Rocklobster.

More information: Michael Geddes, University of Adelaide, 08 8303 5934

FISH FACTS

Australia's seafood trade

Australia has such a long coastline, a relatively small population and the world's third-largest Exclusive Economic Zone. Why then, do we not produce enough seafood to feed ourselves? While the fisheries resources in our Exclusive Economic Zone (which generally extends 200 nautical miles from the coast) are reserved almost exclusively for Australian fishing fleets, these waters are not very productive by world standards. Unlike other countries, the Australian continent does not have large offshore upwellings or sufficient runoff from the landmass to provide nutrients that naturally support larger fish stocks (Hobday et al. 2006). Australia's seafood comes from a combination of wild capture and aquaculture sources. Although the levels of Australian aquaculture and wild-capture production have changed over the past 20 years, the total volume of seafood production (edible and non-edible) has remained relatively stable. Australia has historically been a net importer of fisheries products in volume terms, but a net exporter in value terms. An estimated 70 per cent of the edible seafood we consume (by weight) is imported from Asia, New Zealand and elsewhere (Ruello 2011). Australian fisheries exports are dominated by high-value products, such as rocklobster, premium tuna species and abalone. Imports largely consist of lower-value products, such as frozen fillets and canned fish. In the early 2000s, the gap between the value of imports and exports closed and in 2006-07 the value of imported fisheries products exceeded that of exports for the first time, a trend that has continued since. In developed countries it is common for domestic production to be unable to keep up with demand. The European Union, the US and Japan are all net importers of seafood products. The difference between Australia and many other developed countries is that a large proportion of Australian product is sold to export markets, rather than being used to supply domestic demand. The value of Australian seafood exports (about \$1.27 billion in real terms) is about 56 per cent of the value of production. These products are generally still available in Australia, but Australian consumers are often unwilling to pay as much as export markets. As long as Australian products receive a premium price in export markets, producers will continue to sell a large amount of their seafood product overseas. This pattern also occurs in the UK, which is a net importer of seafood despite being a traditional fishing nation and a major seafood exporter (principally to the rest of Europe).



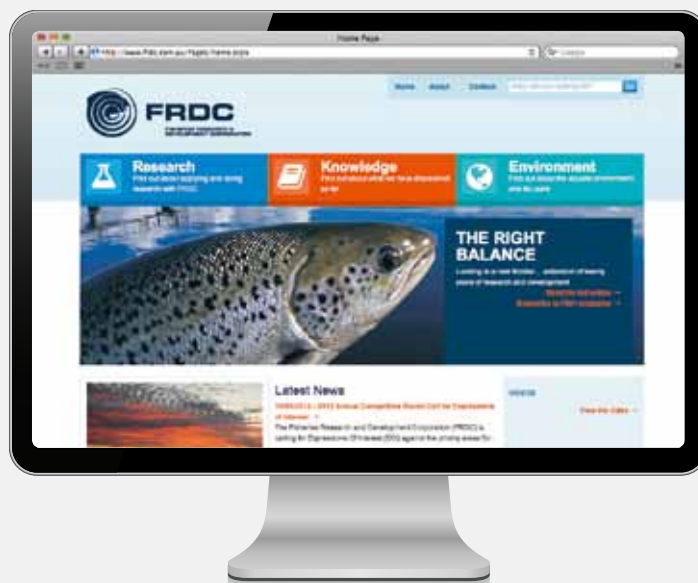
SOURCES:
Hobday, AJ, Okey, TA, Poloczanska, ES, Kunz, TJ & Richardson, AJ 2006, Impacts of climate change on Australian marine life—Part A: Executive summary, report to the Australian Greenhouse Office, CSIRO, Hobart, available at <http://cmar.csiro.au/climateimpacts/documents/Impacts-of-Climate-Change-on-Australian-Marine-Life-PartA.pdf>
Ruello, NV 2011, A study of the composition, value and utilisation of imported seafood in Australia: project final report, Ruello & Associates Pty Ltd for the FRDC, Canberra



**FINDING
KNOWLEDGE**

www.frdc.com.au

The central point
for all fisheries R&D
information



**SHARING
KNOWLEDGE**

facebook.com/FRDCAustralia

Connect with us
for the latest
FRDC updates



Science for Sustainability