

News, research, on-ground works, innovation and events with a focus on improving fish habitat

AUSTRALIAN NEWS

Snags for Perch

Research in the Shoalhaven River estuary, New South Wales, is providing valuable information on the importance of snags as habitat for Estuary Perch. Video footage is showing large numbers of Perch, and other fish, using the areas with woody habitat. To watch:

<https://www.youtube.com/watch?v=6W9X4gZk6ao&feature=youtu.be>



Estuary Perch in the Shoalhaven River. Image sourced from video: Dylan van der Meulen.

On the move at under 5cm

Baby barramundi are on the move in the Mackay-Whitsunday region, north Queensland. Researchers found fish as small as 43 mm using new fishways to make their way into wetland habitats. These juveniles grew very quickly in these wetland areas, putting on a lot more weight and growing to be 300 to 400 mm long, before returning to the river the next year. In two days more than 4,000 fish from a variety of species successfully migrated through the fishway and out into the wetlands, including Giant Herring, Silverbiddies, Mullet, Crescent Perch and Banded Scats. More: <http://www.abc.net.au/news/2016-03-28/mackay-baby-barramundi-numbers-soar/7279016>



Juvenile Barramundi measured against Banded Scat. Photo: Reef Catchments

Progress on the oyster reef

Over 6 million Angassi oyster larvae have been bred and transferred onto a mussel farm in the Oyster Harbour estuary, Albany, Western Australia. These will be the first oysters moved to areas of the seabed prepared with laterite, a type of rock found naturally in Oyster Harbour. This harbour was once home to such a reef that people came and took lorry-loads of oysters away. The reef is now gone as the area was dredged and lost the substrate needed by the oysters. There are a few Angassi oysters left in isolated areas and these were used as the brood stock for the larvae that it is hoped will, in time, rebuild the reef. More: <http://www.abc.net.au/news/2016-05-06/ambitious-shellfish-reef-project-begins-off-albany/7386172>.



Angassi Oyster brood stock – hope for the future of Albany's reef. Photo: Nature Conservancy

Lake Macquarie living with *Caulerpa*

Despite extensive eradication efforts, small populations of the noxious seaweed, *Caulerpa taxifolia*, have been found in Lake Macquarie, on the New South Wales central coast. Research since the first outbreaks has identified that, while not desirable, this aquatic weed is not as detrimental to native seaweeds or seagrasses as initially thought. It has been found to create habitats similar to native species, will grow intermingled with them, and fish and other invertebrates have been found using *Caulerpa* as habitat. Due to the cost and difficulty involved in removing *Caulerpa* and the virtual impossibility of eradication, efforts are focusing on limiting its spread in the Lake. More: <http://www.abc.net.au/news/2016-02-09/impacts-of-rediscovered-noxious-seaweed-in-lake-macquarie/7152894>

Pygmy Perch breeding in the Basin

The drought that persisted for most of the last decade decimated Pygmy Perch populations in the lower Murray-Darling Basin. These fish are wetland specialists and these were the first areas that dried out. When their usual habitat all but disappeared, the few remaining fish were captured and formed the basis of a captive breeding program. Five years later, the wetlands are wet again and two species, Southern and Yarra Pygmy Perch, have been reintroduced. Not only did the fish survive, but monitoring has found the fish are now reproducing. More: <http://www.abc.net.au/news/2016-03-04/pygmy-perch-population-in-lower-murray-darling-recover/7219228>

Similar efforts are underway in South Australia, where farm dams are being used to breed up populations of endangered or declining species such as River Blackfish, Yarra Pygmy Perch, Murray Hardyhead, Southern Pygmy Perch and the Southern Purple-Spotted Gudgeon. Thought to be extinct for 30 years, Southern Purple-Spotted Gudgeon were found by chance in a farm dam. Earlier this year, 70 of these rare fish were taken from a surrogate dam where they had been able to grow to 5 cm long, and released into a wetland east of Adelaide. More: <http://www.abc.net.au/news/2016-03-03/surrogate-dams-south-australian-fish/7216286>.

Who's the biggest mover?

Around 20,000 fish are currently being monitored in the River Murray using special electronic tag readers. The readers are positioned at the entrance and exits of fishways along the river and they have picked up some impressive travels. Silver Perch have been notable travellers: 'Percy' swam 470 km in one month; 'Polly' did 601km at a rate of 2km per day; and 'Pesca' travelled 558km, covering approximately 13km per day. Golden Perch are also moving large distances. In 24 days, 'Goldie' used eight fishways in her 401km. This year's biggest mover to date is 'Gordon' a Golden Perch who travelled 493km from lock 2 near Waikerie in South Australia to lock 11 at Mildura in Victoria. More: <http://www.mdba.gov.au/news/who-will-be-river-murray%E2%80%99s-biggest-mover?>



Fishways are the reason fish like 'Gordon' are now able to make their impressive journeys within the River Murray. Photo: Arthur Mostead

Coal not good news for fish or coral

Researchers have found that chronic exposure to coal dust can be lethal for corals and reduce seagrass and fish growth rates. The effects on coral and seagrass are worse as the concentration of coal dust increases. Fish growth rates were similarly depressed at all coal concentrations tested. Coal dust enters the marine environment at loading and storage facilities when it is blown or washed into the sea, and during transport. More on this research by Berry and others in *Nature Scientific Reports*: <http://dx.doi.org/10.1038/srep25894> [Open access].

Mangrove dieback in the Top End

Researchers are monitoring an unprecedented mangrove dieback event on the coast of the Gulf of Carpentaria, with hundreds of hectares of mangroves dying in two locations: at Limmen Bight River, in the Northern Territory, and Karumba in Queensland. The dieback is of concern given the fisheries habitat and shoreline protection provided by mangroves. It is thought the dieback might be correlated with this year's extreme warming and climate events in the region that have contributed to the large scale bleaching of the Great Barrier Reef on the eastern side of Cape York. More:

<https://research.jcu.edu.au/tropwater/research-programs/australian-mangrove-and-saltmarsh-network/latest-amsn-news>



Mangrove dieback east of Karumba.
Photo: James Cook University

Fish and mangroves

Researchers have used unbaited underwater video to document fish use of mangroves in a tropical estuary. During daylight hours, fewer fish species were observed to use the mangrove forest than had been thought from other research that used netting techniques. However, the sloping edges of the mangrove forest where the water gradually became deeper were more heavily used. For more on this research by Sheaves, Johnston and Baker in *Marine Ecology Progress Series*: <http://dx.doi.org/10.3354/meps11690>.

Nursery for natives, not Carp

Wetlands in the lower Murray River floodplain are vital nursery habitats for native fish but are compromised by an influx of Carp when they are flooded after a dry period. Managers at the Tar-Ru Wetland put in a temporary screen in the inlet creek to stop larger carp from entering when the wetland was being flooded. The screen allows smaller native fish, like Gudgeons and Rainbowfish as well as juvenile Golden and Silver Perch, to enter. With the bigger carp excluded, this wetland is also seeing improved water quality and aquatic plant germination, both of which will support the growth of the juvenile native fish. More on this project:

<http://www.dpi.nsw.gov.au/about-us/media-centre/releases/2016/wetland-nursery-project-brings-lower-murray-back-to-life>

Seagrass in the Bay

The seagrass beds in Victoria's Port Phillip Bay are important fish habitat areas. Researchers recently assessed the impacts of turbidity and nutrient loading on the health of the Bay's seagrass. The primary threat to the seagrass was found to be light limitation caused by high turbidity. This report by Cook and others is available at

<http://www.melbournewater.com.au/whatwedo/protectrivers/Documents/Seagrass%20-%20protection%20and%20recovery.pdf>.



Turbidity is the greatest current threat to seagrass habitats in Port Phillip Bay. Image extracted from pdf.

Fish-friendly marinas

Two North Queensland marinas – Hamilton Island Marina and Abell Point Marina – are the latest to achieve accreditation as Level 3 Clean Marinas and Fish Friendly Marinas. Both marinas are major tourist destination and boating hubs. The accreditation process includes a site audit of key operational areas includes inspections of key activities and equipment, site facilities and management. Read more at <http://www.marinebusiness.com.au/news/north-queensland-marinas-collect-environmental-awards#jE8wt8rsFRG5iAdO.99>

The Loddon Chute is gone

'The Chute' was a significant fish passage barrier on the Loddon River in north-eastern Victoria. It was a long, dark pipe, through which the water flowed quickly, and had been used to regulate flow in the lower Loddon. The Chute has now been replaced with a vertical slot fishway that allows the same flow rate as the pipe and therefore not affecting irrigation flow delivery, but enables fish to migrate upstream. More:

<http://www.nccma.vic.gov.au/library/scripts/objectifyMedia.aspx?file=KMSMedia/pdf/146/13.pdf&fileName=North%20Central%20Chat-%20June%202016.pdf> (scroll to page 2)

Canberra's Carp

Carp appear to be the dominant fish in Canberra's Lake Burley Griffin. It's estimated that Carp make up 50 per cent of the fish numbers and about 85 per cent of the fish biomass in the Lake. A review of the fish of the area suggests that Carp were introduced in amongst other fingerlings when the Lake was stocked with Trout in the mid-1970s. They quickly made the Lake home, lowering the water quality and making it more difficult for other fish to thrive. For more on this story: <http://www.abc.net.au/news/2016-05-16/how-did-carp-end-up-in-lake-burley-griffin/7412888>.

Carp herpes virus FAQs

The proposed release of a Carp herpes virus is being hailed as the thing that is going to tip the balance in favour of native fish. However, many questions have been raised around if and how it will work and what will happen with all the dead carp. Experts have put together information and videos in a series of FAQs to help answer some of these questions. Find it here: <http://www.pestsmart.org.au/carp-herpes-faq/>.

Fish in the 'trap and haul' at Hinze Dam

Australia's first 'trap and haul' fishway is located at Hinze Dam in south-east Queensland. At a World Fish Migration Day 2016 event, local students were able to release into the dam more than 20 species of fish that had been collected in the fishway, as well as an eel and a turtle. A video showing the process enabling fish to pass this significant barrier is available here: <https://www.youtube.com/watch?v=Q8pMZgpl3M0>.

Barwon fishway doing the business

The Barwon River barrage, downstream of Geelong, Victoria, was a significant barrier within this river where interrupted river movement by fish is a major threat to the native fish populations. In 2013, a vertical-slot fishway was installed to replace an old rock fishway. Monitoring has found that fish are using the new fishway. Up to 3500 fish were found to migrate through the fishway per hour and 16 native fish were represented, including Tupong, Common Galaxias, Australian Smelt, Australian Grayling and Yellow Eye Mullet. Read the report by O'Connor and Pickworth: <https://fishways.files.wordpress.com/2015/05/assessment-of-the-barwon-river-barrage-vertical-slot-fishway-oconnor-and-pickworth-2015.pdf>



The new fishway on the Barwon River barrage. Image: D. Lovric (extracted from report)

INTERNATIONAL NEWS

Hay, Whitebait!

Populations of Whitebait have declined in the rivers about Christchurch, New Zealand, in the years since the major earthquake. The reduction in spawning success is due largely to damage to the riverbanks and changes in saltwater levels. Researchers have found that hay bales are perfect spawning habitat for Whitebait. Almost 200 hay bales have been placed along a three kilometre stretch of the Heathcote River, positioned so that they are covered at very high tides. The adult fish swim in and lay their eggs between the bales. When the water level drops, the eggs stay moist. More:

<http://www.stuff.co.nz/environment/76662048/scientists-aim-to-bring-whitebait-back-to-christchurch-rivers>



Not just hay bales - spawning habitat for Whitebait. Photo: EOS Ecology

Growing more Salmon with rice

A pilot project with rice farmers near Sacramento, California, USA, is allowing juvenile Salmon to access flooded rice fields as part of their annual downstream migration. The food available to fish in rivers has been reduced by at least 95 percent over the last 150 years because of the loss of wetlands. (There are 1,000 times more invertebrates per square meter in the floodplain than in the river). Rice fields were considered to provide a surrogate wetland. Monitoring found that flooding a rice field boosts the population of aquatic insects, which the salmon then gorge on and grow fatter than if they had stayed in the River. There is no impediment to the rice farming activities. The pilot grew out of a highly successful program to alter landscape-level agricultural practices that resulted in saving and expanding wetlands for birds. More: <https://www.newsdeeply.com/water/articles/2016/05/19/how-saving-salmon-could-help-ease-the-next-drought>.

Progress with Pearls

The Freshwater Pearl Mussel has disappeared from much of its former range due to poor water quality and the reduction in host fish numbers as the impact of fish habitat loss grew. A project to restore these Mussels is nearing completion in the River Ehen in Cumbria, Northern England, home to the only breeding and largest population of these Mussels left in England. Alongside fencing and replanting riparian areas, old techniques used to control bank erosion are also being reintroduced. To see the progress and learn more about the projects to improve water quality and fish habitat: <http://westcumbriariverstrust.org/news/pearls-in-peril-film-no-2>.



Willow spiling is an old technique used to control riverbank erosion. Image from video: West Cumbria Rivers Trust

Cephalopods on the rise

Researchers investigating the decline in the Giant Australian Cuttlefish population have identified that there has been a significant increase in the population of squid, octopus and cuttlefish (cephalopods) globally. Cephalopods are often referred to as 'weeds of the sea' as they grow rapidly, have short lifespans and flexible habits, allowing them to adapt to changing conditions, such as temperature. The findings suggest that they may be benefiting from a changing ocean environment. More: <http://www.australiangeographic.com.au/news/2016/05/squids-on-the-rise-with-climate-change>.

An Amazon reef

A new sponge and coral reef more than 600 miles long and covering more than 3,600 square miles of ocean floor has been found at the mouth of the Amazon River at the edge of the South American continental shelf. The Amazon River discharges more water than any other river in the world, forming what is known as the 'Amazonian plume'. It is muddy and nutrients in the plume support oceanic algae blooms hundreds of miles from shore. The researchers found that the biology of the reef varied depending on its location in relation to the seasonal fluctuations in the plume. The southern section is covered by the plume three months of the year, so it gets more light and therefore has more of the colourful corals usually associated with coral reefs. The north section is shielded from sunlight by the muddy plume more than half of the year and is dominated by sponges. More:

<http://www.theatlantic.com/science/archive/2016/04/scientists-discover-a-new-coral-reef-at-the-amazons-mouth/479259/>

The little creek that stocks a system

Two years ago, there was a badly degraded, little unnamed creek that got a makeover: a box bridge replaced a culvert that trout couldn't swim through and 1,500 feet of streambed was rebuilt. Now, it looks as if every meander and riffle bed has always been there and this creek is a Cutthroat Trout spawning zone crucial to the entire Blackfoot River drainage, in Montana, USA. It's one creek among many that are contributing to the restoration of this river basin. Grazing, channelisation, road sediment, poorly placed culverts and irrigation problems had left 96 per cent of the Blackfoot tributary streams impaired. Over the past 25 years, 27 streams have had their channels reconstructed and another 38 streams have had fish passage improved. More: http://missoulian.com/news/local/quarter-century-of-restoration-paying-off-in-blackfoot/article_db8be17b-470b-53d1-82b4-fc1cc560e134.html.



The little creek that provides spawning habitat for Cutthroat Trout. Photo: Tom Bauer.

Deep habitat

Exploration of the Marianas Trench Marine National Monument has looked at deep sea habitats, including hydrothermal vent sites, mud volcanoes, deep-sea coral and sponge communities, and seamounts. One of the deep-water fish caught on film is the Chimaera, known also as ghostshark or rabbitfish, and most closely related to sharks and rays, it is now known only from deep water. To see more:

<http://oceanexplorer.noaa.gov/oceanos/explorations/ex1605/logs/photolog/welcome.html>.



The Chimaera makes its home in the extreme deep waters of the Marianas Trench. Photo: NOAA Office of Ocean Exploration and Research, 2016 Deepwater

A barrage of negative effects on fish

An estuary barrage was constructed on the Nakdong River, South Korea, in 1987. It divided the freshwater from the seawater. 20 years of monitoring data has revealed that 36 species of fish disappeared after the construction of the barrage. Conversely, 18 species have appeared at the site. This included eight freshwater species, all but one of which was an exotic or translocated species. While the barrage does have fishways and 31 species were found to be using them, there was no evidence of any recovery of the pre-barrage fish assemblages. For more of this research by Yoon and others in *Limnology*:

<http://link.springer.com/article/10.1007/s10201-015-0476-1>.

Slowing the flow

A five-year effort to improve the quality of water leaving Forestry Commission areas in the River Tyne catchment, north England, is coming to an end. Silt and low PH had led to low numbers of fish in the drains, so the project has focussed on slowing the flow of water and improving water quality. Drainage was altered so that dirty water first flows into a silt trap, pond or rough ground to filter it. In 24 hectares of otherwise unproductive land, the drains have been blocked entirely, enabling the ground to be wetter and for longer periods. Banks have been stabilised with broadleaf trees, which will also help keep the water cool and increase supplies of food for fish. More on this project: tynerivertrust.org/wp-content/uploads/2013/08/Tyne-Rivers-Newsletter-May-2016.pdf (scroll to page 4).

A holistic approach wins the European Riverprize for the Segura River

Extensive restoration efforts over thirty years have returned Spain's Segura River to health. This once polluted and water-stressed river in Europe's driest basin has been transformed from an exposed sewer to a healthy river. The transformation was based initially on wastewater management and reclamation. The Segura River project integrated social, environmental and economic restoration activities, using science as the foundation and shared governance in support. Read more:

http://www.errconference.eu/images/presentations/Segura_River.pdf



The Segura River runs through agricultural lands, supporting an active irrigation industry, and the city of Murcia. In the 1990s (left) it was polluted and the subject of public outcry. Now (right) it is used by the people for boating and fishing. Images sourced from Segura River Project presentation

Instream restoration of highly modified rivers

Researchers in Germany looked at the impact of instream habitat restoration in highly modified waterways. They compared the impact four different instream structures (bank rip-rap, benched bank rip-rap, successively grown riparian wood and introduced dead wood) had on fish numbers and diversity over seven years. They found that dead wood had the strongest effects on fish biomass and density as well as the diversity of species. However, they found no change in the species that had been targeted for conservation, suggesting that instream habitat rehabilitation efforts are better focussed on waterways that are not highly modified. Read more of this work by Pander and Geist in *Ecological Engineering*:

<http://dx.doi.org/10.1016/j.ecoleng.2015.12.006>.

Restoration makes more Salmon ...

Researchers looked at the impact of boulder clusters, V-dams and half-log covers on Atlantic Salmon and Brook Trout numbers 20 years after the structures were installed as part of a fish habitat restoration project in Joe Farrell's



Atlantic Salmon benefit from the restoration of boulder clusters. Photo: www.dfo-mpo.gc.ca.

Brook, Newfoundland, Canada. Boulder clusters had remained intact and increased pool habitat as well as the availability of instream cover. Only 40% of the half-logs remained and while in relatively poor shape they were effective in increasing instream cover. The researchers also found that the density and biomass of Atlantic salmon increased rapidly after structures were installed and remained significantly higher 20 years later. Read more of this research by van Zyll de Jong and Cowx in *Ecological Engineering*:

<http://dx.doi.org/10.1016/j.ecoleng.2016.02.029>.

... and more Trout

An assessment of the long-term impact of instream restoration of forest streams in Finland has found increases in Trout. 12 years after the installation of boulders and snags, the researchers found that the combination of boulders and snags was particularly beneficial for Trout aged 2 years and older. Younger fish showed a significant long-term population increase in boulder-restored sections. For on this research by Louhi and others in the *Canadian Journal of Fisheries and Aquatic Sciences*: <http://dx.doi.org/10.1139/cjfas-2015-0546>.

RESOURCES

2016 European River Symposium presentations

The presentations from the 2016 European River Symposium, held in early March, are now available. Topics include Women and Waters, Partnerships for European Rivers, and Advancing Partnerships in River and Water Management, as well as the presentations from the finalists in the RiverPrize: <http://www.errconference.eu/index.php/news>.

Baffle design testing report

The report on the performance monitoring and assessment of common rail field test components and baffle - type fish passage systems for culverts is now available. All baffle systems were demonstrated to be superior for providing fish passage to a culvert without baffles, however the report contains recommendations to further improve their functionality for fish passage. Available: <http://www.oceanwatch.org.au/wp-content/uploads/2016/01/final-report-Common-Rail-Proof-of-Concept-and-Baffle-Field-Trial-Assessment-Report.pdf>.

Swimways poster

The first global 'Swimways' poster visualises the routes migratory fish species travel around the world. Available from: <http://swimway.org/>

World Fish Migration Day 2016

Resources, including a map with links to WFD events, are available here:

<http://www.worldfishmigrationday.com/events?country=26>.

ABOUT NEWSTREAMS

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Australian National Sportfishing Association - NSW www.ansansw.com.au

Capital Region Fishing Alliance <http://crfa.org.au/>

Ecofishers www.ecofishers.com

Fisheries NSW www.dpi.nsw.gov.au/fisheries/habitat

Fisheries Victoria www.dpi.vic.gov.au/fisheries

Freshwater Fishing & Stocking Association of Queensland (FFSAQ) www.ffsaq.com.au

NSW Council of Freshwater Anglers www.freshwateranglers.com.au

NSW Fishing Clubs Association www.nswfca.com.au

PIRSA Fisheries and Aquaculture www.pir.sa.gov.au/fisheries

Recfish Australia <http://recfishaustralia.org.au/>

RecfishSA www.recfishsa.com.au

RecfishWest www.recfishwest.org.au

Recreational Fishing Alliance of NSW www.rfansw.com.au

SUNFISH www.sunfishqld.com.au

Sweetwaterfishing <http://www.sweetwaterfishing.com.au>

Victorian Department of Environment and Primary Industries www.depi.vic.gov.au

VRFish www.vrfish.com.au

Western Australia Department of Fisheries: www.fish.wa.gov.au/Pages/Home.aspx