

Newstreams

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

This issue of Newstreams is proudly brought to you by OzFish Unlimited as part of a project to build the capacity of recreational fishers in Australia to address fish habitat issues. The project is funded by the Fisheries Research and Development Corporation. Over the next couple of years the project will develop the framework for an action plan to guide fish habitat action in Australia. To find out more: www.ozfish.org.au



AUSTRALIAN NEWS

Fish hotels for Yeppen Lagoon

Yeppen Lagoon, in Queensland, is one of the Fitzroy floodplain's largest and deepest lagoons, however fish habitat mapping indicated that it was lacking the large woody debris that provides both habitat and food sources for fish. The installation of 10 'fish hotels', made of interconnected and stacked hardwood, will help fill this habitat gap. The fish hotels have space between the logs to allow fish movement and are filled with smaller timber to ensure they provide suitable habitat for a wide range of the lagoon's fish species. More: <http://www.fba.org.au/new-fish-hotels-to-provide-habitat-for-juvenile-fish/>.



One of the structures destined for Yeppen Lagoon. Photo: Fitzroy Basin Association.

Returning Perch

Estuary Perch were known as 'Native Perch' by fishers fishing the Glenelg River near Casterton, Victoria, and they were a common catch. However, these fish had not been found in this area since the 1950s when the Rocklands Reservoir was constructed – until about 5 years ago, when a surprised fisher found he'd reeled one in. The return of Estuary Perch up the Glenelg River has continued since then, responding to improved health of the river and restored flow from environmental watering. In 2016, Estuary Perch were found 270km up-river of where they were six years ago. More: <http://www.ghcma.vic.gov.au/news/article/fish-tagged-to-solve-mystery-of-reappearing-perch>.

Focus on Freshwater Mussels in Far North Queensland

Not a great deal is known about native Freshwater Mussel species found around Cape York, Queensland. An apparent decline in Mussel populations in the Annan River was a concern to the Traditional Owners, as Mussels are both fished for food and have important cultural significance. Using both scientific techniques and local knowledge, researchers and Indigenous Rangers have identified several distinct species and some of the impacts on local populations. It appears both sand dredging and over-harvesting may be having a negative impact. For a video: <https://www.youtube.com/watch?v=4hd72r4Ghlg> or a project summary: <http://bit.ly/2m1UDkd>



This large Mussel is the main species harvested in the Annan River. Photo: James Cook University.

Drying wetlands bringing fish back

Wetlands on farms in north Queensland's Burdekin region are being revived by drying them out and reinstating natural cycles of drying and wetting. These waterways are now artificially flooded all year round for irrigation farming, allowing invasive weeds, like Typha grass, to take hold. Typha completely chokes the waterway, becoming a barrier for fish to move and when the plant material breaks down, the de-oxygenated water is inhabitable for fish. Only 20 to 30 years ago these areas were still salt water marshes filling up in the wet season then drying down at the end of the year. The new projects which mirror this natural process, have seen the death of invasive weed species and the revival of fish populations.

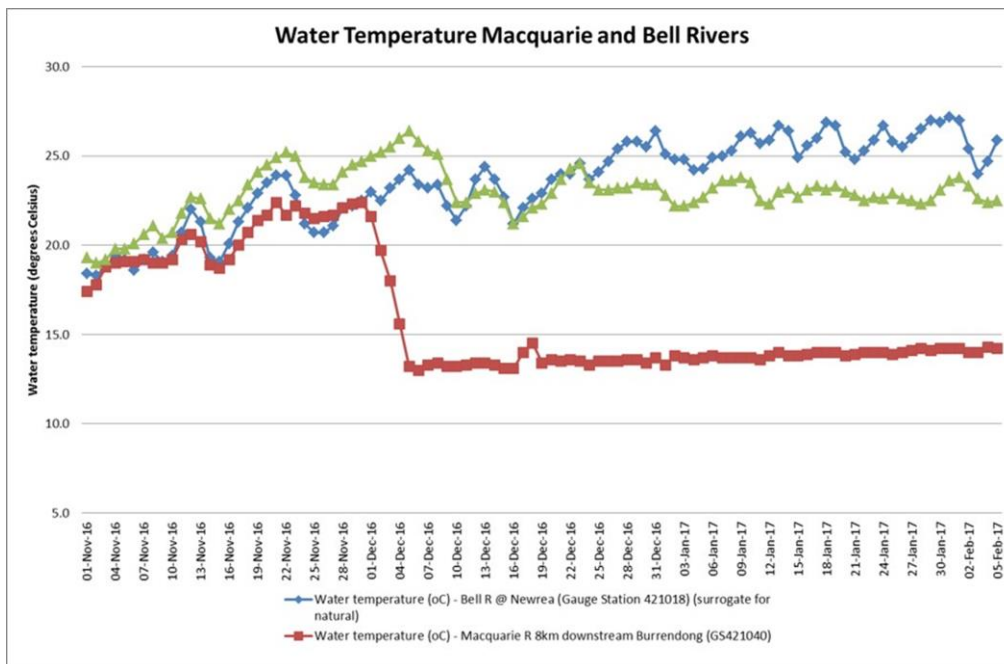
The number of fish species in the waterways has gone from 3 to 18 in just three years since they started removed weeds. Read more: <http://www.abc.net.au/news/2017-01-22/queensland-wetlands-project-mimic-natural-cycle/8198992>.



The number of fish species has increased 6-fold since the natural cycle has been re-instated. Photo: Ben Millington.

Back to the drawing board for Burrendong curtain

The bad news for fish in central NSW's Macquarie River is that the Burrendong thermal curtain to reduce cold water pollution releases from the Dam has failed. The thermal curtain technology had been largely untested at the scale of the large dams that are typical of those on Murray Darling Basin rivers but was an attractive option to test because at just \$3-4 million they are relatively cheap to build and operate. Traditional concrete and steel multi-level offtake towers used to release water at different levels of the dam typically cost tens of millions of dollars to construct. The thermal curtain on Burrendong Dam commenced operation in July 2014, and since the dam had consistently been less than 25% capacity. Burrendong Dam filled during the spring and summer of 2016/17 and unfortunately, the curtain failed the 'full dam' test. A component at the bottom of 57 metres of water has broken and the curtain cannot be raised to the surface. Water NSW are currently reviewing repair options. For more information, contact [Allan Lugg](#), DPI Fisheries.



While we swelter through a hotter than normal summer, the native fish in the Macquarie are 'freezing their fins off'. The graph shows how water temperature in the Macquarie River is now responding. The dramatic plunge in the red line is due to releases being switched from the radial gates on the top of spillway where the water is warmest to the outlet at the bottom of the main wall where the water is colder. Graphic: Allan Lugg

Mary River Cod back in the Bremer River

Mary River Cod were once found in the Bremer River, southern Queensland, but became extinct in the 1930s through habitat degradation. 100 Cod were released to re-start the population at Yamanto. To help them on their way a 2.4m fish ladder (the state's longest fish ladder) at Berry's Weir was completed in October 2016. It has already proved successful with fish as small as 15mm making their way to the top. The Bremer River is home to fish that migrate between the sea and fresh water, species like Australian Bass, Long-finned Eel, Sea Mullet and Freshwater Mullet.

The abundance of fish and the diversity and variety of species upstream had been significantly reduced by the barrier. Read more: <https://www.qt.com.au/news/video-fish-ladder-makes-way-for-endangered-species/3123178/>.



A section of the fishway that will be part of the restoration of the Mary River Cod population.
Photo: Queensland Times.

Environmental water, floods and the Summer of 2016

Fish throughout large parts of the Murray-Darling Basin suffered through a severe blackwater event following the extensive flooding at the end of 2016. Much of the Basin experienced floodplain inundation to an extent not seen for up to 30 years, depending on the catchment. The resulting blackwater was not good news for fish. Murray Cod in the lower Darling River were less badly affected as they had had the benefit of an environmental water flow prior to the rains, which had given them a cue to migrate. The timing and degree of environmental watering was a critical factor for this fortunate population of Murray Cod. For a review of the event and how and why fish were affected: <http://www.socialfishing.com.au/2017/01/23/2016-fish-kill-find-out-the-reason-behind-the-devastating-fish-kill/>.

Fish tagged – tick. Now, wait for the water ...

Researchers have tagged Golden Perch and Murray Cod in Victoria's Loddon River in preparation for studying their response to this Autumn's environmental water release. Native fish respond to flooding by moving out onto the floodplains along our rivers and feeding and increases in water level are also a potential trigger for these fish to breed. To follow this story: <http://www.countrynews.com.au/2017/02/18/4310/something-fishy-about-river-flows>.

Black Bream habitat

55 Black Bream have been tagged and researchers are examining their movement and behaviour throughout Western Australia's Swan and Canning Rivers. They've found the average distance covered by tagged fish throughout the first four months of data collection was 33km. One fish covered an impressive 130km and another travelled 11km in less than 15 hours. There was also movement of some fish between the Swan and Canning Rivers. The Bream preferred shallow habitat, favouring areas with complex habitats, such as snags and reef/rock bars, and avoided areas with low oxygen. Low oxygen appears to be stopping bream from inhabiting deeper areas, which historically they were known to use. It's thought that reduced flow in the rivers and a build-up of nutrients in sediments has created low oxygen conditions in the deeper holes. Read more: <http://recfishwest.org.au/innovative-tracking-program-sheds-new-light-on-bream/>.



Understanding Black Bream habitat use will help target rehabilitation projects.
Photo: RecfishWest.

Eggs can take the pressure

It is now known that adult and juvenile fish can be injured or killed by the rapid change of pressure they experience as they make their way through weirs. Researchers have now examined the impact on eggs and larvae. It appears that eggs, but not larvae, were unaffected by all levels of decompression tested. In addition, there was no evidence that the hatch rate of Golden Perch or Silver Perch eggs was impaired. The tolerance of eggs to rapid decompression is thought to relate to the fact that they do not contain free gas that could expand when pressure is reduced. The study found that larval Murray Cod, Golden Perch and Silver Perch were susceptible to injury only once pressure drops below about 40% of the pressure to which they are acclimated. The significant larval mortality of Murray Cod, Silver Perch and Golden Perch after passing an 'undershot' weir structure appear to be less due to pressure but may be due to other hydraulic stresses such as fluid shear stress, which can occur in turbulent flow immediately downstream of weirs. Read more of this work by Boys and others in *Biology Open*: <http://dx.doi.org/10.1242/bio.017491> [Open access].

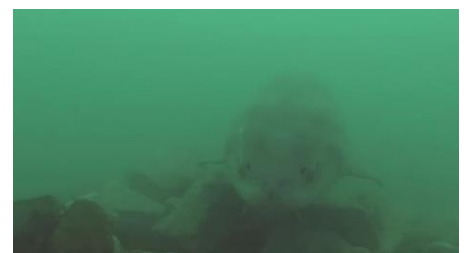
River Flows for our Fish

The results of a survey assessing the knowledge and capacity of recreational fishers to participate in, and contribute to, discussions about environmental water delivery for fish identified that recreational fishers understand that there is a link between fish populations, river health and water flows. Almost 80 percent of the survey respondents demonstrated a good understanding of how river flows affect the life cycle of fish. Sixty one percent of respondents also indicated that they had concerns about the impact of environmental water delivery on native fish. These concerns were predominantly about the timing of these events. Cold water pollution was also noted as an important issue. Read the report here: http://www.dpi.nsw.gov.au/data/assets/pdf_file/0010/695782/river-flows-for-our-fish-murray-darling-basin.pdf.

INTERNATIONAL NEWS

Lake Sturgeon nursery surprises

Construction crews recently deposited 25,000 tons of limestone blocks on the bottom of the rivers feeding into Lake St Clair, USA, in the latest phase of a 10-year effort to lure Lake Sturgeon to rock spawning reefs and help restore severely depleted populations of these once-common fish. Researchers know the reefs work because they have underwater video showing Sturgeon spawning and have collected eggs there, however the whereabouts of the juveniles was not known. Lake Sturgeon spend 5 to 10 years in nursery habitat so understanding what and where the nurseries are is important. It was assumed that the recently hatched young move downstream into the river delta or to Lake St. Clair. However, researchers have found that despite river-current of about a metre per second, some of these young fish, a couple of centimetres long at most, remain in the St. Clair River's North Channel. They were clustered at river bends where the bottom is a mix of sand and silt and contains the larval insects that the very young Sturgeon eat. It appears they manage to stay in place against the current by burrowing into the bottom. Read more: <http://ns.umich.edu/new/multimedia/videos/24492-searching-for-young-lake-sturgeon-near-detroit-area-spawning-reefs>.



Lake Sturgeon can grow to 7 feet in length, and weigh up to 300 pounds (120kg). Females live 80 to 150 years and take 20 to 25 years to reach reproductive age. To watch a video of these fish using the constructed habitat: https://www.youtube.com/watch?v=g_oXh3306mg. Photo: USGS, extracted from video.

Wetland ... carpark ... wetland

In the late 1960s a tidal marsh area next to the Del Mar Fairgrounds, San Diego County, California, was filled to prevent flooding and provide car parking for the fairgrounds. Now, thousands of cubic yards of dirt are being removed to restore the property to a tidal wetland. The work is the second phase of a project to restore about 15 acres of wetland. After the fill has been removed, the land will be contoured to allow for tidal inundation and to create varied elevations. This will be followed by the planting of around 35,000 plants. To follow this story: <http://www.delmartimes.net/news/sd-cm-nc-fairgrounds-parking-20170214-story.html>.

Salmon back in the Sultan River

Coho Salmon returned to the upper Sultan River only one month after a dam's sluiceway was removed and a new diversion constructed that mimicked the original river bed. This opened up 15 miles of upstream habitat. The discovery of redds a few weeks later was the first time Salmon have been in that upper reach of the river in almost 90 years. More: <http://www.heraldnet.com/news/after-90-years-salmon-are-returning-to-upper-sultan-river/>.



Now when Salmon approach the dam, they don't see a big ramp with water flowing down, they see a river. Photo: Ian Terry / The Herald.

The pointy end of habitat pollution

DuPont has agreed to pay \$42 million and assume cleanup costs for the release of mercury that polluted more than 100 miles of the Shenandoah River watershed in Virginia, USA. The industrial site released mercury in the 1930s and 1940s and monitoring over the past two decades showed mercury levels have failed to decline. The settlement calls for DuPont to pay for restoration projects including wildlife habitat restoration, improvements to water quality and fish habitat, mussel restoration and efforts to improve fish populations. More: <https://www.law360.com/articles/873226/dupont-to-pay-42m-for-va-mercury-pollution>.

Fish-friendly culverts make economic sense

As well as being fish-friendly, so-called 'ecological design culverts' have been shown to make economic sense. In over half the case studies put through a cost-benefit analysis these culverts were more cost effective than maintaining the traditional, hydraulic culverts and that it is most cost effective on small streams compared to larger ones. Read more: <http://afs.tandfonline.com/doi/full/10.1080/03632415.2016.1246875>.

Payback time at Half Moon Reef

Half Moon Reef is the successful restoration of an underwater oyster colony in Matagorda Bay, Texas, USA. Completed in 2014, the 54-acre Half Moon Reef restores what was once a fully submerged, structurally complex reef that had been completely lost. Surveys show that Oysters have now attached to roughly 70 percent of the reef's total surface and between January 2014 and May 2016, the size of those oysters increased by 551 percent. Biomass, which is a measure of the level of sea life in and around the reef, is 1,014 percent greater than at nearby areas. Local and visiting recreational fishers are enjoying the benefits brought by the restored reef. A survey found that the increased recreational fishing at Half Moon Reef added US\$691,000 to Texas' gross domestic product year over a year and generated an additional US\$1.27 million in annual economic activity with 94 percent of fishermen reporting that the restored habitat at Half Moon Reef offered a more satisfying experience than other fishing locations. For more about this project:

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/explore/half-moon-reef.xml>.

Managing pulse flows for Salmon

Researchers examined 12 years of monitoring data to see the impact of a management regime of regular pulse flows in the Stanislaus River, California, on Chinook Salmon. Using daily counts of the fish, they assessed the relative influence of water temperature, flow, moon illumination, weather, operation of a rock barrier and managed pulse flows. The analysis identified that the pulse flows stimulated an immediate increase in daily passages, but the response was brief and represented a small portion of the total run. There was also no additional increase in daily counts when pulse flows exceeded 20 cubic metres per second. The results of the study provide some guidance to better manage water resources to benefit both Salmon and other water users. A video explaining the study is available:

<https://www.youtube.com/watch?v=kRUU1PIZAec&feature=youtu.be>, or read the article by Peterson and others in the *North American Journal of Fisheries Management*: <http://dx.doi.org/10.1080/02755947.2016.1240120>.



One of the 38,206 Salmon that helped researchers better understand the impact of pulse flows. Photo: Fishbio (extracted from video).

Rewards in the Wye

Catches of Atlantic salmon from the River Wye, Wales, in 2016 have been the highest recorded for twenty years. Anglers reported 1,665 salmon caught this year, 36 per cent higher than 2015 and 366 per cent better than 2002, the worst year ever for the river. The steady improvement in catches since 2002 bucks the trend of most other rivers in the UK. Over the past 20 years, over £9M worth has been invested in the Wye to improve habitat and the fishery. Fishways have been built and weirs removed, stream habitat improved and both the quantity and quality of the water restored. The objective has been to restore the river's ecology in a permanent and sustainable way, significantly expanding the salmon's spawning capability in the Wye and increasing the number of juvenile fish surviving to migrate out to sea. The Wye's other fish species including trout, grayling and coarse fish are also benefiting from this work. Read more: <http://www.wyeuskfoundation.org/news/press.php>



Fixing habitat along the River Wye has led to the highest Salmon catches in 20 years. Photo: Wye and Usk Foundation

Whitebait moving more freely

Four out of five of the Whitebait species in the Manawatu River, New Zealand, are in decline but it was not known if any were using a fishway built specifically to help re-build native fish populations. About 200 Inanga (Whitebait), the weaker swimmers of the Whitebait species, released below the fishway were found to be using it. The work is part of the Manawatu River Leaders' Accord pledge to take responsibility for the poor health of the river and improve its 'mauri' (life-force). As well as fish passage, the Accord has funded 66,420 native plantings alongside waterways; 208,487 metres of stream fencing; and 98 Environmental Farm Plans completed to help farmers reduce the environmental footprint of farming. Read more: http://www.nzherald.co.nz/wanganui-chronicle/horowhenua-chronicle/news/article.cfm?c_id=1503788&objectid=11783081.

RESOURCES

Wetland Plants of the Wet Tropics

A user friendly illustrated field guide providing comprehensive information on the wetland plants of the Wet Tropics. For more information and to purchase or access an e-version: <http://www.terrain.org.au/index.php/News-Resources/Latest-News/World-of-wetland-plants-has-never-looked-so-identifiable>.

Queensland catchment stories

A detailed and interactive resource for currently 9 Queensland catchments. Interactive maps and information relating to waterways, hydrology, fauna and flora, land-use and social values are included, as is how these have changed as the catchments have been developed. To access: <https://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/processes-systems/water/catchment-stories/>.

Database: the biodiversity and ecology of intermittent rivers worldwide

Intermittent River Biodiversity Analysis and Synthesis has produced the first database providing access to biodiversity and environmental data collected from intermittent rivers all over the world. It is free and available: <http://irbas.cesab.org/contribute-and-access-data>. An article by Leigh and others in *Ecology and Evolution* explains step by step how to contribute and extract data: <http://dx.doi.org/10.1002/ece3.2679> [open access].

Special Issue: *Stream Ecosystems and Restoration: linking bioassessments to improved planning and design strategies*

A special issue of the journal *Water* with articles covering innovative ecological assessment methodologies to improve stream restoration planning and design strategies, including studies on what ecological indicators best characterize ecological resilience and detect improvements in biotic integrity after restoration. To access: http://www.mdpi.com/journal/water/special_issues/stream-eco-restoration [Open access]

ABOUT NEWSTREAMS

Newstreams is an email newsletter to keep people up to date about fish habitat activities and important developments in fish ecology and habitat. It is free by email subscription.

To **subscribe** use the [form](#).

You can send in your habitat news by emailing the [editor](#), Liz Baker.

Back issues can be accessed from <http://www.fishhabitatnetwork.com.au/archive>.

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Department of
Primary Industries



Website www.fishhabitatnetwork.com.au

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www.facebook.com/fishhabitatnetwork

Amateur Fishing Association of the Northern Territory (AFANT) <http://afant.com.au/>

Australian Fishing Trades Association <http://afta.net.au/>

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.ffa.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