

Newstreams

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

This issue of Newstreams is brought to you in partnership by the [Fish Habitat Network](#), with funds from the NSW Recreational Fishing Trust, and [OzFish Unlimited](#), with funding from the Fisheries Research and Development Corporation, as part of a project to build the capacity of recreational fishers in Australia to address fish habitat issues.

AUSTRALIAN NEWS

Fishers, and fish, win at Landcare

It is a natural alliance and the NSW Landcarers were very happy to congratulate the Inland Waterways Rejuvenation Association on their Fish Habitat Champion (Organisation) Award. In less than 10 years, the IWRA has become a group that undertakes major fish habitat replenishment projects. They have installed hundreds of large snags in the Macquarie River, central NSW and their 'River Repair Bus' sees work-for-the-dole participants plant thousands of native trees and remove tonnes of rubbish from the waterways. A video is available [here](#). The individual Fish Habitat Champion Award was won by Ross Webster, a champion of the Yass River and its fish habitat for more than two decades. He has worked with several local and regional groups to improve the Yass River. Read more at

<http://www.fishingworld.com.au/news/inaugural-fish-habitat-awards-presented-at-2017-landcare-conference#MzZf4ICEV3zfeUUj.99>.



Some of the IWRA volunteers, celebrating of behalf of their community in Dubbo. Photo: NSW Landcare.



Ross Webster, a long-time champion for Yass River fish. Photo: Fishing World.



Jade Paton, a 'wetland warrior'. Photo: Hawkesbury Gazette.

The Young Landcare Leader was awarded to Jade Paton, who created the volunteer group 'Wetland Warriors', who work on wetlands throughout the Hawkesbury, NSW, including fencing wetlands, establishing reed beds, which were in protective cages to try and stop carp damage, and constructing fish hotels. More:

<http://www.hawkesburygazette.com.au/story/5070509/helping-environment-leads-to-future-career/>.

The Fish Habitat Innovation Award went to Shoalhaven Riverwatch for work in developing the 'Shoalhaven Sand Sausage' as an innovative technique for stabilising riverbanks and improving fish habitat. The sand sausage is a sandbag, up to 50m long, that can be installed on the sand and mud flats in the inter-tidal zone, creating a protected environment in which mangroves, river oaks and wetland grasses can get established. More:

<http://www.southcoastregister.com.au/story/5050978/riverwatch-wins-fish-habitat-award-for-innovation/>.



Sand sausage for fish. Photo: Riverwatch

Cod activity in the men's shed

Volunteers from the Lake Boga Men's Shed in Victoria have built 10 fish havens, or 'Cod Condos', which will provide a rest area for fish in high flows and act as a refuge from predators. These structures, along with 10 large snag piles, are ready to be installed in the Little Murray River downstream of Little Murray Weir and will help native fish including Murray Cod, Golden and Silver Perch and Catfish. Other works in the Little Murray River include the construction of two new fishways, re-snagging between the two weirs, and provision of fish friendly flows. Read more: <http://www.fishingworld.com.au/news/cod-condos-for-little-murray#KmWkax5bjvGkYZgz.99> .

Creating a habitat splash

Recreational fishers from the Onkaparinga chapter of OzFish Unlimited (South Australia) celebrated National Gone Fishing Day by installing 180 concrete blocks at Perry's Bend in the Onkaparinga River, South Australia. The blocks will help alleviate erosion of the river banks and early observations have shown fish using the area already. The limestone blocks should be colonised in time by mussels, barnacles, tubeworms and oysters. The arrival of the concrete was accompanied by that of specially constructed woody debris piles, the 'missing' critical component of habitat along shoreline, which will also be installed soon. This work is part of an ongoing project to reinstate fish habitat in this river. More: <https://www.facebook.com/Onkaparinga-River-Fish-Habitat-1652034288157277>.



One more pallet of limestone blocks being loaded ready to be installed in the river. Photo: Travis Howson.

Matching flows and fish in the Lachlan River

A series of environmental flows in the Lachlan River, in central NSW, were timed to provide benefits for native fish. Designing river flows for native fish can be complex with different species requiring specific flows at differing times through all their life stages. The first flow commenced in September and targeted breeding opportunities for species like Murray Cod, which require stable flows over their nest sites whilst they guard their developing eggs. A small rise at the end of November created a flush to distribute the newly hatched young fish and help produce food for the young. Other fish such as Freshwater Catfish, Australian Smelt, and Murray-Darling Rainbowfish are also likely to benefit from these flows. Local fish will also benefit from the residual flows to the Great Cumbung Swamp which help replenish the reed beds and wetlands in the core of the swamp. Read more:

<http://www.cowraguardian.com.au/story/5001623/lachlan-flows-for-fish-breeding/>.

Some improvement for native fish in the MDB

An analysis of multiple studies appears to show that Murray Cod, Trout Cod and Macquarie Perch populations in the Murray-Darling Basin are all improving from increased flows and better habitats. The populations of other fish species are remaining stable, and a small number are declining. The data showed that environmental flows have resulted in more than 40 positive responses, such as fish spawning and recruitment events, including improved spawning events for Golden Perch, Murray Cod and Silver Perch. The Yarra Pygmy Perch, the Purple-spotted Gudgeon and the Southern Pygmy Perch have been identified as in decline. In addition, Carp remain a key challenge in the Basin. Read more:

<https://www.mdba.gov.au/media/mr/not-bad-cod-do-better-native-fish-evaluation>.

Saltmarsh and mangrove really are valuable!

Researchers have matched up fish caught, the market value of those fish, and data about the habitat areas within the estuary that supplied the food the fish ate. The result is an estimated value of fisheries harvest supported by habitats of up to A\$7,200,000 per year, depending on habitat type, estuary and the types of fish that are caught. Saltmarsh in the Clarence River, NSW, had by far the greatest economic value per-unit-area, with an average estimated Total Economic Output (from fisheries harvest) of \$A25,741 per hectare per year. The value for mangrove was estimated to be A\$5,297 per hectare per year. Average Total Economic Output in the Hunter River was A\$2,579 per hectare per year for saltmarsh and A\$316 per hectare per year for mangrove habitat. Read more of the study by Taylor and others in *Ecological Indicators*: <http://dx.doi.org/10.1016/j.ecolind.2017.08.044>.

Fish hotels a hit in Lake Bonney

More than 15 tonnes of red gum logs, hammered into cube-shaped structures or 'fish hotels', have been dropped to the bottom of Lake Bonney, a freshwater lake attached to the River Murray, South Australia. Four to six of the 'hotels', which are about 1.5m square and about 1m high, are positioned around a buoy. Four years of effort has resulted in a 4km trail of hotel clusters. Using a sounder, local fishers see fish on them, not all the time but as they move along this habitat trail. More: <http://www.abc.net.au/news/2017-11-14/fish-hotels-provide-essential-habitat-lake-bonney-riverland-sa/9145550>.



One of the volunteers with a fish hotel ready to become part of the 'habitat trail'. Photo: ABC News: Brittany Evans.

Victorian recreational fishers doing habitat business

Fishers have been busy with a wide range of fish habitat rehabilitation projects in the Goulburn-Broken and North East CMA areas. In the Goulburn Broken region, more than 120 volunteers from 10 angling groups and 4 community groups were involved planting about 1,900 trees and shrubs along the banks of the Jamieson River, Little River, Delatite River tributary, Ryans Creek, and Hughes Creek. Fencing to manage grazing and Desert Ash control was also completed where needed prior to revegetation. In the North East region, on-ground works have focussed on log jams and bed seeding installations, as well as fencing and revegetation. In total over 300 logs have been added to waterways, and approximately 60 boulders have been placed. More: <https://www.facebook.com/VictorianFisheries/videos/1795383997198769/>.

The habitat that got away in the Shoalhaven

In his memory, 89-year-old Charlie Weir sees a Shoalhaven River, NSW, that isn't here today: a river edged with reeds teeming with little fish. He also remembers fishing a river where catches were always very good, with big flathead and a seven-foot grey nurse shark, even up the river as far as Riversdale, and 'monster' Jewfish. The riverbanks now are largely bare, and undermining of the riverbanks is causing silting up of the river and loss of fish habitat – which, he argues, is more of an issue than concerns about water contamination. He has spent a lifetime trying to improve the health of the river, planting about 100,000 mangroves and 25,000 casuarina trees along more than seven kilometres of the riverbank. Read more: <http://www.southcoastregister.com.au/story/5076581/pfas-fish-contamination-a-worry-but-river-protection-the-overall-main-concern-charlie-weir/>.

Coastal restoration overview for Australia

There is growing recognition in Australia that protecting habitats and hoping for natural recovery is not enough and active restoration is needed. The restoration of coastal habitats such as coastal wetlands, mangrove forests, coral reefs, seagrass meadows, saltmarshes, shellfish reefs and kelp forests is a major industry elsewhere in the world. Restoration practitioners and researchers recently met to review best practice restoration based on scientific understanding of historical disturbances, causes for habitat decline, and innovative methods for reinstating the structure and function of coastal habitats. A summary video is available: <https://www.youtube.com/watch?v=lukSpo3mM-4&feature=youtu.be>.

Dam costly clean-up

A company cleaning up a dam dumped approximately 8,407 square metres of soil on marine plants at Toogoom, Queensland. The plants were killed, which led to the company being charged and subsequently fined \$40,000 and ordered to pay over \$7,500 in costs. All marine plants, which includes mangroves, saltmarsh and seagrass, are protected under Queensland law, whether alive or dead and regardless of land tenure. More:

<https://www.daf.qld.gov.au/about-us/news-and-updates/fisheries/news/company-fined-40000-for-damage-to-marine-plants>.

Understanding river regulation and freshwater fish in the Lower Murray

River regulation has profoundly altered the ecological character of many rivers, including south-eastern Australia's Lower River Murray. Extensive regulation via upland dams, water abstraction and many lowland weirs has reduced mean annual discharge to the sea by two-thirds and transformed how the river works. This had led to the simplification of a formerly diverse fish community. Researchers have synthesised a significant body of work relating to freshwater fishes in the river to set a foundation for future monitoring, research and management. Read more of this work by Wedderburn and others in the *Transactions of the Royal Society of South Australia*: <https://doi.org/10.1080/03721426.2017.1373411> [Open access].

Mixed response to introduced snags

Researchers assessed the effects of reintroducing large woody debris on fish along the Barwon–Darling River, western NSW. They compared fish species and abundance between reaches that still had snags present, reaches where there was no snags and reaches where snags had been re-introduced. They sampled before and several months after the wood was reintroduced, and following several large floods. Results demonstrate that, within this study area, reintroducing large woody debris had limited effects on fish. There were no significant differences in total abundance or species composition between the three types of reaches, although these did change over time. The researchers suggest that the lack of response by fish as part of this study was because the physical character and position of the reintroduced wood pieces did not replicate 'natural' reference conditions. Read more about this work by Matheson and others in *Marine and Freshwater Research*: <https://doi.org/10.1071/MF16290>.

INTERNATIONAL NEWS

Fish notice habitat action

The Trinity River, near Junction City, California, USA, is another river system where large dams and past mining activity have degraded Salmon habitat. The dams ended the historic flooding of the floodplains along the river. These floodplains, and the associated side channels and tributaries, were safe harbours from dangerously fast flows for juvenile salmon that were making their way to the ocean. These areas also acted as spawning habitat for returning adult fish. There are no plans for removing the dams in the near future, so because flows cannot be increased, the Trinity River Restoration Program is working around that by lowering the flood plains, building new channels and installing large structures. These dredge tailings from the old mines are now being used to restore the habitat in the river. Large rocks are being used to support newly installed wood structures; the fine sediments used to promote new plant growth along these old mining sites; and the larger gravel is being placed in the river for fish spawning habitat. Fish are already using these new habitat areas to spawn. Read more: <http://www.times-standard.com/article/NJ/20171031/NEWS/171039966>.



Wooden structures and trees are helping to re-build Salmon habitat, despite the dams staying in place in the Trinity River. Photo: Matt Mais, Yurok Tribe.

European Oysters in the restoration spotlight

The Solent, the strait that separates the Isle of Wight from mainland England, once supported the biggest oyster fishery in Europe. There were once deep-sea oyster beds in the English Channel, thought to have provided larval input for areas like the Solent, where 20,000 oysters were caught per ship, every day by more than 40 ships daily between 1830 and 1876. However, oyster beds have followed the steep decline seen in many fisheries around the world. The Solent native oyster fishery has collapsed, due to historical overfishing, disease, invasive species and pollution from both land and sea, and was temporarily closed in 2013. The restoration of the native oyster in the Solent is using several techniques, including protected seabed sites, ranching areas and cages suspended from pontoons in marinas. Initial trials were successful and showed not only did the oysters flourish in cages but reproduced, re-seeding wild areas. So far, over ten thousand oysters of the goal of 5 million have been introduced to the Solent. Read more:

<http://www.blumarinefoundation.com/project/solent/>.



Map from the Olsen's Piscatorial Atlas of 1883 showing the distribution of the European flat oyster in the North Sea and neighbouring areas, c.1883. Brown shaded areas denote oyster beds. Photo: Blue Marine Foundation.

It's crooked and the fish love it

Big Spring Creek, in Montana, USA, is a very popular trout fishery, so it did not go unnoticed when, in 1961, the local landowner decided to straighten 4,500 feet (1.4km) of meandering creek into a 2,000-foot (0.6km) channel to improve flood control. It was not illegal at the time. The subsequent erosion caused by the straightening devastated fish habitat upstream and caused flooding downstream. 55 years later, bulldozers began the restoration by filling in the straightened ditch with dirt, removing 60,000 cubic yards of material to recreate the meanders and introducing flow into the restored, curvy stretch of stream. Root wads have been placed into the banks to create fish habitat and control erosion and about 1,000 trees and shrubs were planted to start the riparian revegetation. Local fishers also helped by cutting 15,000 willow branches that were planted to provide bank stabilisation. Brown and Rainbow Trout, as well as whitefish, have already been seen in the newly crooked creek.

More: <http://www.greatfallstribune.com/story/news/2017/11/08/how-lewistowns-big-spring-creek-got-its-meander-back/844369001/>.



The straightening of the creek devastated fish habitat. Photo: Montana Fish, Wildlife and Parks.



The restored 'natural rhythm of riffle, run, glide, pool' and is bringing the fish back. Photo: Rion Sanders.

Fencing small waterways a good idea

In New Zealand, only streams wider than a metre and deeper than 30cm must be fenced to keep stock out of them, not smaller waterways. However, researchers have found the smaller, exempt streams actually account for 77 per cent of the contamination load in a catchment. The smaller waterways feed water into the lakes and rivers and provide essential habitat and breeding areas for a range of species. By the time they join up with bigger streams, much of the pollution has already occurred. Read more of this work by McDowell in the *Journal of Environmental Quality*: <http://dx.doi.org/10.2134/jeq2017.05.0212> [Open access].

Smith Mountain Lake gets some structure

Smith Mountain Lake, Virginia, USA, is richer in fish habitat to the tune of 105 more structures. The Lake has been lacking natural fish habitats because of the large amount of shoreline development means there are fewer downed trees and brush in the water where fish can hide. The structures, which are plastic and look similar to pine trees without needles, were placed along the shoreline in between 4 and 10 feet of water. The structures will especially benefit Bass, Sunfish and Crappie which spend much of their early life near the shoreline. These latest additions join the more than 700 fish habitats, primarily composed of milk crates zip-tied together, that have been installed under the docks of several homes around the lake. More:

http://www.thefranklinnews.com/news/local/habitats-placed-to-help-fish-populations-grow/article_a98d1108-c894-11e7-9f21-6b5652167715.html.



A barge-load of fish habitat ready to be installed. Photo: John Shepelwich.

Natural infrastructure reduces the cost of disasters

When the series of hurricanes devastated the Caribbean, and areas of the south-eastern United States this year, less damage was done than might have occurred due to coastal reefs, mangroves and wetlands. These types of natural infrastructure can prevent flooding and save hundreds of millions of dollars in storm damage. Research assessed the value of coastal wetlands in the USA following Hurricane Sandy in 2012 and found that wetlands protected areas of the east coast from more than US\$625 million in direct flood damages. Wetlands reduced damage by more than 22 per cent in half of the affected areas and by as much as 30 per cent in some states. Read more of this study by Narayan and others in *Scientific Reports*: <http://dx.doi.org/doi.10.1038/s41598-017-09269-z>.

The ups and downs of habitat restoration after an oil spill

Ten years ago, the M/V Cosco Busan struck the San Francisco-Oakland Bay Bridge, tearing the ship's hull and releasing 53,000 gallons of fuel oil into the water. The spill caused significant impacts to habitat and fish, including the death of an estimated 14 - 29 per cent of Herring spawn. The area was the largest population of Pacific Herring along the US coast. US\$20 million and over 50 projects later, restoration efforts are still underway and results are variable. A review of the restoration progress of Eelgrass, which Herring use to spawn, and Rockweed, an intertidal alga, has shown how difficult restoration can be when there is also increased natural variability in water conditions. In the case of Eelgrass, extreme temperatures, drought conditions, extreme freshwater outflows and low salinities have made it difficult for the new plants to survive and, in many cases, there has been a significant reduction of eelgrass, in both the restoration plots and in other existing eelgrass beds. Read more about restoration efforts: <https://darrp.noaa.gov/oil-spills/10-years-later-restoring-injured-natural-resources-after-cosco-busan>, or about the effects of the oil on Herring: <http://www.bitsofscience.org/spilled-bunker-oil-spill-san-fransisco-4593/>.



Components of the oil were found in herring embryos and eggs. Several months after the spill, live fish were found to have developed heart defects commonly associated with oil contamination. A year after the spill, almost no live herring larvae hatched from the spawning grounds. Photo: <http://www.bitsofscience.org>.

'Re-wilding' the ocean

The Atlantic Ocean once had rich and biodiverse habitats, such as seagrass meadows and kelp forests, supporting productive fisheries. The impact of the destruction and degradation of these habitats by poor water quality, destructive fishing practices and coastal developments is also well recognised. The latest challenges facing the Atlantic include the growth of marine renewable energy infrastructure. However, 'ocean rewilding' is being proposed as a potential solution. Ocean rewilding is 'the large-scale restoration of ecosystems where nature can take care of itself'. One group is attempting to utilise the opportunities created by offshore and coastal renewable energy to do this. Tidal lagoons, for example, are being proposed as a potential option for reliable and predictable power generation, however these large sheltered lagoons can also provide opportunities for environmental renewal. Read more: <https://theconversation.com/how-underwater-gardening-can-rewild-the-atlantic-ocean-85794>.

Never too cold to do some habitat work

Volunteers worked in the snow to repair erosion-affected banks and replant the riparian area of the Bitterroot River, Hamilton, Montana, USA. The erosion had been affecting water quality and filling in fish spawning habitat. The previous riprap had failed and ended up in the river, so the area between the river and walking path has been built up and replanted. More: http://ravallirepublic.com/news/local/article_4f7dc4e0-6142-50f6-9b40-2dc9c54b58f0.html.



Digging post holes for protective fencing in the snow – the dedication of volunteers. Photo: Michelle McConnaha.

Flows an issue of ‘national significance’ in NZ

The flow and quality of streams and rivers has become an issue of national significance in New Zealand. Researchers have been developing a better understanding of the links between the capacity of a river to transport the invertebrate food that drift-feeding fish need and the productivity of the fisheries. They have found that as the flow declines fewer invertebrates drift in the water column so drift-feeding fish have less to eat. That means fewer fish may be supported or they may grow more slowly. More: <http://www.cawthron.org.nz/coastal-freshwater/news/2017/cawthron-research-shows-greater-river-flow-needed-fish-growth-and-abundance/>.

Taking rocks away to help fish

Rather than adding rock structure, volunteers in the San Juan Islands have been removing the large angular rocks from hundreds of metres of shoreline. Over the decades, the rock had fallen from armouring structures and covered large portions of the natural beach. Shaw Island’s Blind Bay is a priority forage fish spawning region in the county. Surf Smelt spawn year round on these beaches but require small gravel and sand to successfully incubate their eggs. At one site alone, about 120 cubic yards of large rock was removed. A combination of sand and small gravel nourishment material, also known as ‘fish mix’, was then brought in to restore suitable spawning substrate to the impacted beach. Read more: <http://www.sanjuanjournal.com/life/friends-of-the-san-juans-save-forage-fish-habitat/>.

RESOURCES

Proceedings – River Symposium 2017

The 20th International Riversymposium and Environmental Flows Conference was held in September. Presentations are now available here: <http://riversymposium.com/2017-program-sessions/>.

Presentations – 2017 Murray-Darling Basin Native Fish Forum

The theme of the forum was ‘Fish, Flows, Habitat and Heroes’. Topics included the latest native fish research, recreational fishing perspectives, the importance of cultural flows and the challenges of turning science into policy and management. More: <https://getinvolved.mdba.gov.au/Nativefishforum2017>.

ABOUT NEWSTREAMS

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

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

Freshwater Fishing & Stocking Association of Queensland (FFSAQ) www.ffaqs.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 Dept of Environment, Land, Water and Planning (DELWP) www.delwp.vic.gov.au

Victorian Fisheries Authority: <https://vfa.vic.gov.au>

VRFish www.vrfish.com.au

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