

# Newstreams

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

Welcome to Newstreams #78. For a little pictorial journey that reminds us of why we love looking at fish in their natural habitats: <https://www.theguardian.com/environment/gallery/2022/jan/21/under-the-sea-ocean-art-2021-underwater-photo-competition-in-pictures>.

Newstreams is brought to you in partnership by the [Fish Habitat Network](#), with funds from the [NSW Recreational Fishing Trust](#). As well as [Newstreams](#), the recreational fishers of NSW also support fish habitat action on the ground through the [Habitat Action Grants](#), [website](#) and [Facebook](#).

Liz Baker, [Editor](#)

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## AUSTRALIAN NEWS

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### Callop breeding best it has been for 10 years

In South Australia's Riverland, the water levels in the Murray River are the highest they have been in years and this has had a flow-on benefit for native fish, especially Callop (Golden Perch) and Silver Perch. Fish numbers are at their highest since 2012. The breeding success is being attributed to high rainfall upstream and environmental watering, which have created the flowing river habitat these fish require. Increased flows have also boosted the survival rate of eggs and larvae due to the environment they are exposed to while drifting downstream. More: <https://www.abc.net.au/news/2022-01-28/callop-numbers-bloom-in-the-murray/100786672>.



With the right flows and good habitat, these three green blobs will grow into healthy Murray River Callop. Photo: *Primary Industry & Regions SA*.

### Bushfire recovery in progress

The 2019 – 2020 bushfires burnt areas around the Nymboida River in north-eastern NSW back to bare earth. The catastrophic loss of riparian vegetation was followed by wash of ash-laden sediments into the water. The Nymboida River is home to the Eastern Freshwater Cod, a species which is slowly coming back from the brink of extinction, and one that favours shaded overhangs and snags. Work is now underway to repair and replant riparian areas along the Nymboida River in an effort to stabilise banks and ensure the survival and recruitment of large, overhanging tree species. Once these trees reach maturity, they will provide shade and important food sources for native fish like the iconic and endangered Eastern Freshwater Cod. More: <https://www.youtube.com/watch?v=99q5mt5B0wg>.



Reward for effort – saying hello to one of the Eastern Freshwater Cod the bushfire repair efforts are aiming to benefit. Photo: *OzFish Unlimited*.

## Leaf Oysters - unsung heroes of our estuaries

Of the 14 species of reef-forming oysters and mussels in Australia, Leaf Oysters are the least well known. Camouflaged by a layer of silty mud, they can form reefs, produce mauve pearls, reach dinner plate size, and, preliminary studies suggest, support a high diversity of fish species. Using underwater videos, Yellowfin Bream, Dusky Flathead, Sand Whiting, Sand Mullet, Leatherjacket, and Black Spotted Snapper have been recorded using Leaf Oyster habitat. In Australia, Leaf Oyster reefs are found on soft sediment in estuaries, on sand, mud and among mangroves, from Exmouth in Western Australia to the Macleay River on the mid-north coast of New South Wales. Recent surveys of northern NSW suggest Leaf Oysters have either disappeared from some locations where they were previously known to live, or 30-67% of the shells were found to be dead. More: <https://theconversation.com/leaf-oysters-the-unsung-heroes-of-estuaries-are-disappearing-and-we-know-almost-nothing-about-them-164330>.



Leaf oysters are relatively unknown ecosystem engineers of our estuaries. Photo: *Kirsten Benkendorff*.

## Planting Seagrass

Hundreds of volunteers scoured local Adelaide beaches for a month to collect the 15,000 seeds that have been placed into sandbags and dropped in areas where the seagrass has degraded along this section of the South Australian coastline. The seeded sandbags create more habitat for juvenile fish to breed, feed and seek shelter, improve water quality, and stabilise the sandy seabed. The sandbags will also catch seedlings of seagrass that float past and get hooked on to the fibres. More: <https://www.goulburnpost.com.au/story/7600780/volunteer-efforts-restore-sa-seagrasses/?cs=12> or watch a video about the project: <https://www.youtube.com/watch?v=X9mdQpHo6GY>.

## Farmers, wetlands, and little fish

*Southern Pygmy Perch* have been released into a private wetland in Northwood in central Victoria as part of efforts to build self-sustaining populations. Southern Pygmy Perch thrive in highly vegetated habitat in billabongs and slow flowing creeks and rivers, and unfortunately it is these habitats that have been significantly affected by human activities and primary production. At this site, the wetland has been managed carefully and is still well-vegetated. Habitat rehabilitation work in the nearby Goulburn River is ongoing. More: <https://www.riverineherald.com.au/news/tiny-fish-get-massive-boost/>.



On their way: Southern Pygmy Perch being released into a farmer's wetland where vital habitat has been retained. Photo: *Goulburn-Broken CMA*.

*Purple-spotted Gudgeon* are also reaping the benefits of a farmer's passion for native fish and 'lockdown' boredom. In Loddon Vale in Victoria's north, lockdowns led to the transformation of farmer's paddock into a wetland habitat perfectly suited to Purple-spotted Gudgeon. Aquatic plants, snags and delivery of water have created an environment well suited to its newest inhabitants. Purple-spotted Gudgeon was declared extinct in Victoria in 1998, but 66 were discovered earlier this year in nearby Kerang. More: <https://www.abc.net.au/news/2021-12-06/purple-spotted-gudgeon-breeding-in-victorian-farmers-wetland/100676542>.

## The winds of change affecting larval recruitment

Coastal winds appear to have a significant influence on the recruitment success of various species of estuarine fish, including Dusky Flathead, Yellowfin Bream, Yellowfin Whiting and Sea Mullet. Researchers studying the relationship between coastal wind patterns on Australia's eastern coastline found that onshore south-easterly winds literally blow fish larvae inshore, resulting in higher recruitment into estuaries. Offshore westerly winds tend to create conditions favourable to plankton blooms, boosting food availability in these nursery habitats. The analysis also found that in southeast Australia onshore winds have decreased since 1850. This change in wind patterns, when coupled with the loss of habitats and of mature breeding stock, may have contributed to reduced larval recruitment to estuaries in recent times. For an overview and examples relating to Dusky Flathead and to Queensland's Moreton Bay: <https://www.fishingworld.com.au/news/fish-facts-baby-fish-blowing-in-the-wind> or the research by Schilling and others in *Fisheries Oceanography*: <https://onlinelibrary.wiley.com/doi/epdf/10.1111/fog.12561> [Open access].

## Nightfish returning to the Harvey River

Like many waterways in agricultural areas, the Harvey River in south-west Western Australia was channelised for flood mitigation and irrigation. It became a straight, shallow hot drainage line and the fish moved out. Rehabilitation of the river started with some resnagging and replanting areas of the banks. Under a year later, Catfish, known locally as Cobblers; Nightfish, a cod-like fish found nowhere else; and Marron have returned and are using the newly created habitat. More: <https://www.abc.net.au/news/2021-12-30/harvey-river-restoration-brings-marron-back-to-river/100636124>.



The preferred habitat of Western Australia's endemic Nightfish is still and slow-moving waters with rocks and woody debris.

Photo: [www.freshwaterfishgroup.com](http://www.freshwaterfishgroup.com).

## Not only habitat for fish, but also for fish food

Researchers found that adding in-stream structure to provide habitat for invertebrates also increased the number of fish in Hughes Creek, a degraded stream in south-east Australia. Wooden stakes were hammered into the stream bed so that the ends protruded just above the water surface at moderate flows. Passing sticks and leaves were trapped, increasing local availability of detritus and habitat for invertebrates. The detritus-laden stakes then provided both food and cover for fish. After one year, there were more River Blackfish, Macquarie Perch, and small-bodied species such as Southern Pygmy Perch at the site. More on this research by Cornell and others in *Freshwater Biology*: <https://doi.org/10.1111/fwb.13878>.

## What juveniles need in a nursery

Researchers used unbaited underwater cameras and water quality sensors to better understand the habitat preferences of juvenile Mangrove Jack, Moses Snapper and Yellowfin Bream in upstream estuarine areas. Overall, tidal connectivity and the availability of complex structure were the most influential factors, however only a subset of the factors were influential in determining nursery ground utilization for each species, even among the closely related Mangrove Jack and Moses Snapper. More on this research by Mattone and others in *Marine Environmental Research*: <https://doi.org/10.1016/j.marenvres.2022.105568>.

## Sometimes good habitat is not enough

The Lower Goodradigbee River in the Murrumbidgee region of the Murray-Darling Basin is unregulated, in excellent instream health for much of its length and with plenty of high quality habitat, yet there has been historical decline and localised extinction of large-bodied native fish species. A review of historical records, scientific research and field observations suggests that trout stockings and the continued presence of Carp and Redfin are impacting on native fish recovery. More of this review by Kaminskis in *Pacific Conservation Biology*: <https://www.publish.csiro.au/PC/justaccepted/PC21048>.

## Critical water needs for Mitchell River fish

The Mitchell River in far north Queensland is a largely unregulated waterway with significant wetlands, fisheries, and cultural values. It is also being considered for future water resource development. Researchers examined the links between freshwater flow and floodplain inundation, aquatic plant growth, fish movement and fisheries production. Their study found that the floodplain wetlands were dependent on flows from upstream as well as local rainfall and that floodplain connectivity was important for inputting food into the river itself. Fish also used wet-season connections to the floodplain to access this high-quality food. Wetter years with larger flows supported increased growth and abundance of coastal Barramundi and the pattern of river flow over multiple years is a key driver of Barramundi population dynamics. To access a link to the report (5Mb) on the study by Stewart-Koster and others: <http://era.daf.qld.gov.au/id/eprint/8432/> [Note: click on the Document icon to download the report – the article link does not work].



Connectivity is a critical factor supporting fish and their habitat in the Mitchell River.  
Photo: [www.abc.net.au](http://www.abc.net.au).

## Koondrook and Cohuna fishway gates open

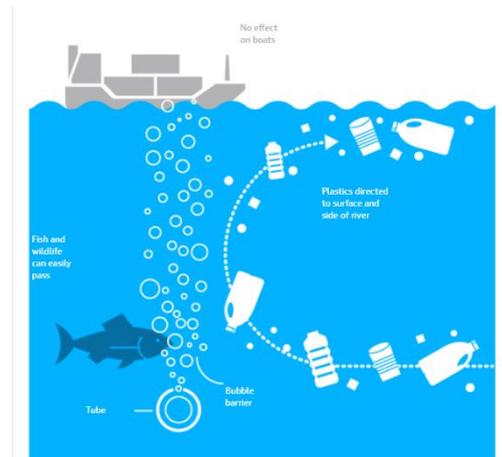
The two new fishways at weirs on the Murray River at Koondrook and Cohuna in Victoria are now open. The fishways connect 140 kilometres of fish habitat in Gunbower Creek to 530 kilometres of open Murray River. The fishway complements other habitat works, including the fish exclusion screen on an irrigation channel in Cohuna. More: <http://www.nccma.vic.gov.au/media-events/media-releases>.

## Tuross River gets more trees

One landholder has planted over 4000 native plants as part of a larger project to ‘future-proof’ 17 km of the Tuross River near Bodalla in southern NSW. The Tuross River has been significantly impacted by droughts and fires, with the result that there has been a massive increase in sediment into the waterway which impacts oyster farming and aquatic habitat. More: <https://www.ils.nsw.gov.au/news-and-events/news/se-news/2022/future-proofing-our-rivers>.

### Blowing bubbles to manage plastic pollution

One of the novel approaches being used or trialled to extract plastic pollution from rivers and harbours before it can reach the ocean is the 'Bubble Barrier'. This device generates a wall of bubbles that pushes plastic waste to one side and towards the surface where it can then be collected. Fish can move easily through the bubbles so this method does not impact on fish passage. Another approach is the 'Trash Wheel', a conveyor-belt system powered by currents and solar energy. It uses long booms with submerged skirts to funnel waste into a central hub where autonomous rakes scoop the collected waste onto a conveyor belt that deposits it all on a barge. Another more high-tech invention is the 'WasteShark', an electronically controlled boat-drone that preys on plastic – up to 350kg at a time. The WasteShark moves around the waterway then back to its docking station autonomously, where it can deposit the collected plastic and recharge. More: <https://www.theguardian.com/environment/2022/jan/11/meet-mr-trash-wheel-and-the-other-ingenious-tools-that-eat-river-plastic> or a video of a Trash Wheel: <https://www.youtube.com/watch?v=E45v-Q0sdp8>.



The Bubble Barrier: the rising bubbles create an upward current that brings plastic waste to the surface. Water flow directs it to the side of the river, stopping it from floating further downstream. Boating and fish are not affected. Image: The Great Bubble Barrier.

### Annual re-purposing of Christmas trees for fish

In many lakes throughout the USA people are submerging and weighing down Christmas trees to form fish habitat. The trees create structures that provide refuge and feeding areas for fish. In some areas this is an annual event; in others, sites are revisited every few years to continually replace the submerged structures. For one of the many stories: <https://www.daytondailynews.com/local/hundreds-of-christmas-trees-get-new-life-in-eastwood-lake/3MVMX64YWNAEFHOWF5XGDY3LXI/>.



One of sites where fish are getting a present – old Christmas trees. Photo: Marshall Gorby\Staff.

### 60 million nests make it the largest fish breeding ground ever found

In a happy routine surveillance accident, the world's largest fish breeding ground has been discovered in the south of the Weddell Sea in Antarctica. It is estimated that around 60 million Icefish nests were found in a 92-square-mile area and each nest contained up to 2,500 eggs. Despite being at over 500m depth, the nests are in warmer water due to a process known as 'upwelling', where cold water rises to the surface. More: <https://www.independent.co.uk/news/science/fish-breeding-antarctica-icefish-nests-b1992699.html>.



The Icefish breeding ground is in an area where upwelling occurs, where cold water rises to the surface and leaves the deeper parts warmer. Photo: AFI Ofnhs.

## Shovelling limestone for 35 years for fish

Every week for over 35 years fishers have been shovelling limestone into specially designed feeder wells on Stony Creek in Pennsylvania, USA, to maintain 20 miles of habitat for Trout. Their work has turned a dead creek into one that has Trout holding over from one season to the next and reproducing in the wild. The limestone is needed to off-set acid mine drainage from long-abandoned deep coal mines, waste coal piles on the surface and strip mines on a nearby ridge. As the limestone tumbles around and is flushed with water, it gradually dissolves, raising the pH and sending a plume of alkaline water downstream. More: [https://www.bayjournal.com/news/fisheries/trout-unlimited-group-keeps-fish-habitat-going-for-36-years/article\\_cd094252-7266-11ec-ae6f-eba4fdb23cbf.html](https://www.bayjournal.com/news/fisheries/trout-unlimited-group-keeps-fish-habitat-going-for-36-years/article_cd094252-7266-11ec-ae6f-eba4fdb23cbf.html).



Local companies donate the limestone and its delivery: the rest of the work is done by the fishers, water, and time. Photo: Ad Crable.

## Does building like Beavers make good fish habitat?

Researchers studying the Long Creek, Montana, USA, found that adding in-stream habitat that mimicked Beaver-made structures created deeper pools and wider riffle habitats compared to an unmanipulated control reach. However, the two reaches studied did not have comparable riverbank vegetation or shade cover. While the mimicry reach provided habitats that support a variety of fish species, those found in this reach were more tolerant of fine sediment and warm water due to the lack of riparian vegetation. More of this research by Albertson and others in *Aquaculture, Fish and Fisheries*: <https://doi.org/10.1002/aff2.30> [Open access].

## Artificial reefs, 10 years on

Researchers monitored artificial reefs for two years at the beginning and the end of a 10-year period. In both monitoring periods, the fish species found on the artificial reefs was distinct to those on nearby natural reefs. Some of the fish species targeted by recreational fishers became more abundant over time, while others were initially absent but became established sometime after the initial two-year monitoring. More on this study by Becker and others in *Fisheries Research*: <https://doi.org/10.1016/j.fishres.2022.106261>.

## The River Spey story

The River Spey is Scotland's second largest river and an important Salmon fishery. Water is extracted to generate hydroelectricity, for drinking water supplies and for agriculture. While concerns about water abstraction remain, much work has been done to rehabilitate the river and its catchment. One award-winning area of restoration involved replanting and resnagging, which in turn slowed the flows enabling the river to return to its original winding course. The removal of weed species and fencing riparian areas are ongoing efforts. More on the River Spey restoration journey:



Restoration of this reach enabled the river to recreate its natural course and increasingly support Salmon. Photo: The Press and Journal.

<https://www.pressandjournal.co.uk/fp/lifestyle/3878895/the-spey-meet-the-people-connecting-communities-with-the-river/>.

## Deposits, withdrawals, and transfers: accounting for fish habitat

Researchers have used the redevelopment of the Toronto waterfront in Canada as a case study for the application of ecological accounting and habitat banking. Fish productivity was the 'currency' used. The Toronto region waterfront is a relatively well-studied shoreline with substantial recent efforts to restore and create aquatic habitats to offset the long-term loss incurred over the last two centuries. The fish communities and habitats have also been assessed and monitored. The concept of 'habitat deposits' is discussed: the idea being that once the habitat restoration – that is a 'deposit' - is complete and the ecological performance targets have been met, the net benefit for fish can be deposited into the integrated planning area's balance sheet and become available for trade with a future offset withdrawal. The full financial costs of the habitat deposit, including costs for planning, construction, and long-term monitoring and assessment are accounted for in a financial counterpart to the ecological habitat supply accounts. More of this work by Doka and others in *Environmental Management*: <https://doi.org/10.1007/s00267-021-01531-5> [Open access].

## Using DNA to survey Beijing's fish

Within highly urbanised landscapes, such as Beijing in China, there are waterways with both still and moving water. Researchers using environmental DNA to survey Beijing's waterways, from the urban centre to more rural areas of the city, found 52 native and 23 non-native species. Water quality was a key factor affecting native fish diversity but had little influence on non-native fish diversity. Variations in the localised cover of either impervious surface or vegetation did not affect fish diversity. There were distinct differences between the fish found in lentic (slow or standing water) and lotic (running water) habitats. More on this research by Zhang and others in *Science Advances*: <https://doi.org/10.1126/sciadv.abk0097> [Open access].

## Warm water fuels cold-water fish

Research in Upper Klamath Lake in southwestern Oregon, USA, found that warm-water habitats can be critically important for the survival of cold-water fish such as Trout and Salmon. Habitats that are warm in summer provide critical habitat at other times of year, providing almost all of the energy needed for growth and reproduction. Gut contents showed that Trout used the lake as foraging grounds in spring and fall, consuming primarily fish. In contrast, summer rations for the trout were much smaller and consisted primarily of insects from the lake's cold-water tributaries. The fish are using the cold clear tributaries, which look like classic Trout habitat, for refuge in summer and spawning in winter, but the lake provides critical feeding habitat in the fall and spring. A summary: <https://today.oregonstate.edu/news/warm-water-habitat-%E2%80%98pays-bills-%E2%80%99-allowing-cold-water-fish-fuel> or more of this research by Hahlbeck and others in *Conservation Biology*: <https://doi.org/10.1111/cobi.13857>.



This prime Trout habitat in Fort Creek is only half the story. Trout use the warm-water habitat in the lake to feed up at other times of the year. Photo: Oregon State University.

## Essex Oyster restoration

The building blocks for oyster reef restoration are being returned to the Blackwater Estuary in Essex in eastern England, where tonnes of oyster, scallop, and mussel shells are being dropped into the water. These value-add to the hundreds of tonnes of shells already dumped to serve as a settlement substrate for the tens of thousands of mature oysters that make up an experimental restoration plot. Historic fishing logs hold descriptions of oyster reefs extending tens of kilometres off this shore. While these have been lost and fragments of them persist around the marshland today. It is hoped that these remaining reefs will export larvae into the water, ready to settle on the shell-substrate habitats now being created. More:

<https://geographical.co.uk/people/development/item/4238-oysters>.



Tonnes of shellfish shells are dropped at a time, gradually rebuilding what was once a flourishing oyster reef. *Photo: Jacob Dykes.*

## Thames River shark habitat

Tope, Starry Smooth Hound and Spurdog sharks have been found in the Greater Thames Estuary in England. Researchers think these species are using this habitat to birth and rear their young. Since being declared 'biologically dead' in the late 1950s, the tidal Thames is now considered to be a recovering estuarine ecosystem. The river is functioning as a breeding ground and nursery habitat for fish, including Smelt and European Sea Bass. More: <https://www.thenationalnews.com/world/uk-news/2021/11/10/three-shark-species-discovered-in-londons-river-thames/>.

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## RESOURCES

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### A tale of environmental flows in Waring/Kaiela (the Goulburn River) (Victoria)

An interactive webpage that follows 'Flo' (a water droplet) on a journey down the Goulburn River and explains how water for the environment is used to improve the health of Victoria's longest waterway: <https://storymaps.arcgis.com/stories/225add6d9e784a6b9511fa7feff56290>.

### Native Fish Report Cards (Victoria)

Brief overviews of the health of target fish populations, providing survey summaries and data on evidence of recent recruitment to the population, presence of multiple size classes and presence of mature fish. <https://www.ari.vic.gov.au/research/field-techniques-and-monitoring/native-fish-report-card-program>.

### Waterway Fire Science (NSW)

A volunteer citizen science project to monitor how waterways, fish habitat, and fish populations are recovering following the devastation of the bushfires: <https://ozfish.org.au/projects/waterway-fire-science/>.

### New Zealand marine species and habitat maps

More than 300 marine data layers and an interactive map tool to visualise, analyse, and download them. Read an overview here: <https://www.doc.govt.nz/news/media-releases/2021-media-releases/doc-makes-marine-species-and-habitat-maps-accessible-for-everybody> or access the portal here: <https://doc-marine-data-deptconservation.hub.arcgis.com/>.

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## ABOUT NEWSTREAMS

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*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** please fill out the [form](#).

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

Back issues can be accessed from <https://www.fishhabitatnetwork.com.au/newstreams>.

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