

Newstreams

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

Welcome to Newstreams #74 and the first issue for 2021.

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](#)

AUSTRALIAN NEWS

Angasi Oysters already on the reef built last November

A reef built off South Australia's coast at Glenelg in November 2020 has already got hundreds of 10-cent piece sized Angasi Oyster per square metre. The Angasi Oysters are flat and native to southern Australia. Populations have largely disappeared due to both over-harvesting and the destruction of the oyster reefs. Further along the South Australian coast near Ardrossan on the Yorke Peninsula, the 20-hectare Windara Reef, was built in 2017 and 2018 and was the largest restored native oyster reef in the Southern Hemisphere. It is now seeing increased marine diversity. More: <https://www.abc.net.au/news/2021-02-12/native-flat-oyster-revival-underway-in-south-australia/13143908>.



A four-year-old Angasi oyster compared with an Angasi spat. Photo: Nick Bosly-Pask, ABC Rural.

Habitat in Gippsland Lakes

The Gippsland Lakes are a network of about 354 square kilometres of lakes, marshes and lagoons in East Gippsland, Victoria. Fish habitat has been improved in several areas with the installation of root balls. The 61 root balls installed in Tambo Bay and the mouth of the Tambo River will provide habitat for Bream, Flathead, and Luderick. The root balls were soaked in the bay for several months to ensure they would sink and stay in place when installed. Along with the addition of woody habitat, an artificial reef has been created by combining limestone rocks and root balls. More: <https://www.facebook.com/VictorianFisheries/posts/a-project-to-provide-more-habitat-for-fish-in-the-gippsland-lakes-is-taking-shap/4995471567189980/>.

Washed-up Seagrass success

An experiment transplanting seagrass shoots that wash up on beaches to repair seagrass meadows has been successful. Locals in Port Stephens on the mid-north coast of NSW have been collecting seagrass shoots as they walk along the beach, which researchers have transplanted into areas where seagrass meadows have been damaged. The survival rate of the transplants is high at between 50 and 70 percent. More: <https://www.abc.net.au/news/2020-12-06/seagrass-rehabilitation-project-a-success-in-port-stephens/12955002>.

Watching things go ‘boom’ after fixing the wetland

Stripping a 1,035-acre blue-gum plantation of trees, allowing it to flood, and leaving it to transform back into wetlands has given fish a place to feed and breed in the headwaters of the Glenelg River catchment. Walker Swamp, upstream of Victoria’s Glenelg River, was in a highly altered, depleted state after 200 years of drainage and water diversion. In the 1980s much of the land was converted to blue gum plantation. The restoration started with trials of temporary structures which were built to re-establish natural hydrology, and the wildlife, including threatened species of fish, came back. The full restoration came with the purchase of the 1,000 acre plantation. The newly restored wetlands are within a natural floodplain of the Wannon River that flows into the Glenelg River. The restoration has increased the period of inundation and created critical drought refuge habitat. More: <https://www.abc.net.au/news/2021-02-07/walker-swamp-blue-gum-plantation-transformed-back-to-wetlands/13110128>.



Not much fish habitat here: the areas that had been Walker Swamp when under plantation. Photo: Nature Glenelg Trust.



Walker Swamp a swamp once more, flooded after rains in November 2020. The stored water filters its way into the Glenelg River. Photo: Mark Bachmann.

Northern river flows important for Barramundi and Banana Prawn

Researchers have studied how Barramundi and Banana Prawns are affected by flow regimes of the Flinders, Gilbert, and Mitchell rivers. These rivers flow into the southern Gulf of Carpentaria supporting important recreational and commercial fisheries. The study found the Flinders River estuary was the most productive of the three studied, having the highest nutrients and highest primary productivity. All rivers were important to Barramundi stocks and growth rates were linked to river flow. More about the researcher:

<https://www.nespnorthern.edu.au/2020/12/16/gulf-rivers-roadshow/> or watch

a video presentation overview of the research here: https://www.nespnorthern.edu.au/wp-content/uploads/2021/01/How-important-are-freshwater-flows-for-Gulf-fisheries_Gulf-roadshow-Oct-20.pdf and here: https://www.nespnorthern.edu.au/wp-content/uploads/2021/01/How-important-are-freshwater-flows-for-Gulf-fisheries_DNRME-Oct-20.pdf.

Research specific to the impact of these northern Australian river flows on Banana Prawn by Broadly and others in *Ecosphere*: <https://esajournals.onlinelibrary.wiley.com/doi/pdf/10.1002/ecs2.3194> [Open access].



The quality of the Gulf Barramundi fishery is influenced by river flows. Photo: www.nespnorthern.edu.au.

Sand slug choke

The Barmah Choke is a narrow section of the Murray River that runs through the Barmah–Millewa Forest on the Victorian / NSW border. The flow capacity of the Barmah Choke has been decreasing for some time and is about 20 percent less now than it was in the 1980s. A survey of 28km of the river found that for every kilometre of river length, 84,000 cubic metres, or 112,000 tonnes, of coarse, sandy sediment lay on the riverbed, ranging from one to four metres deep. This sediment is quite different to the surrounding riverbanks, so it is not caused by local erosion. The source appears to be land-use changes, in particular goldmining and land clearing in the 19th and early 20th centuries, that introduced large volumes of sediment to the river over a short period of time, creating a 'sediment slug' that has gradually been migrating down the river system. More: <https://www.mdba.gov.au/media/mr/mdba-research-finds-centuries-old-sand-slug-barmah-choke>.

More Darling snags

Thirty large, branched logs have been installed into the Darling River, central NSW, to further improve fish habitat and help fish populations recover from the severe droughts of the past two years. More: <https://www.youtube.com/watch?v=XDCOdV9pl7s>.

Monogamy and Murray Cod

Male Murray Cod provide parental care to both eggs and larvae for up to 20 days. Now researchers have discovered that the males are not only looking after the offspring, they are also mating with the same female over multiple years. Genetic analysis of samples of Murray Cod larvae from six sites along the Murrumbidgee River in NSW, found multiple full sibling pairs, that is full brother and sisters. The researchers note that if pair bonding is a feature of long-lived freshwater fish, then it has profound implications for management and conservation strategies. Read more of this work by Couch and others in *PeerJ*: <https://peerj.com/articles/10460> [Open access].

From stormwater sump to urban wetland fish oasis

The lagoons in Deniliquin in southern NSW have been transformed into a functioning lagoon ecosystem with underwater structure, riparian and instream vegetation, and fish, including the Eel-tailed Catfish. Fish hotels and additional planting around the water's edge are helping protect these and other fish, such as Southern Pygmy Perch, from the birdlife which is also appreciating the restored wetland habitat. More: <https://www.youtube.com/watch?v=koXbmtE35Y>.

Order of Australia Medal for river rejuvenator

Michael 'Mick' O'Neil has been awarded an Order of Australia Medal 'for service to the rejuvenation of inland rivers'. Mick has spent more than 15 years working to improve and restore fish habitat around Dubbo in the central west region of NSW. More: <https://ozfish.org.au/2021/01/one-of-the-good-guys-gets-an-oam/>.



Michael 'Mick' O'Neil, OAM. Photo: OzFish Unlimited.

INTERNATIONAL NEWS

National Cemetery Christmas wreaths live on as fish habitat

Previously, the Christmas wreaths placed at each of the graves of fallen service personnel in the National Cemetery in West Virginia, USA, had been thrown away. Now, they are being transformed into fish habitat structures. The wreaths are threaded onto a pipe frame attached to an old wooden pallet, forming a cube. The cubes are simple to load, unload, and install, and many have been installed into a nearby lake. More:

<https://www.outdoorhub.com/news/2021/01/25/national-cemetery-christmas-wreaths-live-fish-habitat/>.



Wreaths repurposed as fish habitat structures.
Photo: Jerod Harman.

New reef to help fish avoid toxic sediment

More than 70,000 tons of quarry rock have been strategically placed on the ocean bottom offshore of the City of Rancho Palos Verdes in California, USA, to create 40 acres of new rocky reef habitat. The area once had reefs, but these were buried in underwater landslides and sediment contaminated with DDT and other toxins. Along with landslides, chemical pollutants impair hundreds of acres of fish habitat on the Palos Verdes Shelf. From the 1940s to the 1970s, millions of pounds of DDT and PCBs were pumped into ocean waters off the Southern California coast. The chemicals are extremely difficult to remove, and hundreds of tons are still in sediment on the ocean floor. The new reefs will help fish and other marine life avoid the polluted sediment, promoting growth of additional healthy habitat like kelp forests.

More: <https://www.fisheries.noaa.gov/feature-story/40-acres-new-rocky-reef-habitat-built-southern-california-coast>.

Salmon welcome an improved Camel

The River Camel in north Cornwall, England, is an important river for the Atlantic Salmon, Sea Trout, and Sea Lamprey. However, obsolete weirs, agricultural pollution, sewage discharges, water abstraction, and invasive species had significantly lessened fish habitat value. Work on both the Grogley Weir and the Keybridge Weir have improved the functioning of the river and its habitat. The work at Grogley involved the removal of a concrete weir, sheet piling and gabion baskets plus approximately 60-65 metres of block stone on both banks. A series of wood deflectors have been added to improve flow and habitat diversity and provide cover for fish. Keybridge Weir was a major obstacle to migratory fish and its removal ensures Salmon and Sea Trout are now able to migrate to their spawning gravels upstream. Incidentally, the name 'Camel' comes from the Cornish for 'the crooked one', referring to its winding course.

More:

<https://www.thepost.uk.com/article.cfm?id=115625&headline=Successful%20restoration%20of%20the%20River%20Camel%20completed§ionIs=news&searchyear=2020>.

Second round restoration with orange trees

Several years ago, woody structure was installed in Florida's Lake Apopka, USA, to improve fish habitat and, naturally, the timber has broken off and decayed over time. The clearing of a derelict citrus grove on the lake shore has provided replacements, with the branches and tangled root balls of the old trees now installed in multiple locations within the lake. More:

<https://theapopkavoice.com/public-private-partnership-helps-rebuild-fish-attractor-locations-in-lake-apopka/>.

Slick life

A dense and diverse array of juvenile marine life has been found in so-called 'surface slicks'. Surface slicks are meandering lines of smooth surface water formed from the joining of ocean currents, tides, and variations in the seafloor. They collect plankton and shelter-providing debris, forming an interconnected superhighway of rich nursery habitat that accumulates and attracts thousands of young fish. In a study of slicks off West Hawai'i, the larvae of at least 112 marine fish species, including Mahi-Mahi, Jacks, and Billfish, were found on the slicks. Larval fish densities were, on average, 7.2 times greater than densities in the surrounding waters and the diversity represented nearly 10 percent of all fish species recorded in Hawai'i. More:



A view of a habitat powerhouse. These slicks off Hawai'i covered 8 percent of the ocean surface but contained 39 percent of the surface-dwelling larval fish. Photo: Jonathan Whitney & Paul Cox (NOAA Fisheries).

<https://www.fisheries.noaa.gov/feature-story/surface-slicks-are-pelagic-nurseries-diverse-ocean-fauna>. Research by Whitney and others in *Nature: Scientific Reports*: <https://www.nature.com/articles/s41598-021-81407-0> [Open access].

Genetic diversity fine after dam removal

Steelhead populations cut off from the ocean by dams can rebound and maintain the same natural genetic diversity as fish populations below dams. Researchers analysed genetic samples from both Steelhead and resident Rainbow Trout in the Elwha River in Washington State, USA, before and after two major dams were removed about 10 years ago. Steelhead migration is influenced both by inheritance and the environment. The study suggests that those blocked from the ocean by dams retained the genetic diversity needed to resume their ocean-going migrations when the dams came out. In addition, the recolonisation of Steelhead has come from populations that were both below and behind the Elwha River dams. More:

<https://www.fisheries.noaa.gov/feature-story/genetic-resiliency-elwha-river-steelhead-outlasts-dams-new-study-finds>.

Warmer water means different fish

Monitoring from 2004 to 2016 has found that juvenile fish abundance in communities found on a rock reef in Long Island Sound off the coast of Connecticut, USA, has changed. During this period, waters also warmed. Two warm-adapted species, Black Sea Bass and Oyster Toadfish, were more abundant in recent samples, while cold-adapted species, including Cunner and Grubby, declined in numbers. Winter Flounder and Rock Gunnel were notably absent in more recent sampling. Summer water temperatures were a small but statistically significant predictor of changes in species composition.



A juvenile black Sea Bass, caught in a fish trap in Long Island Sound, is a sign of warmer water. Photo: NOAA Fisheries.

Historically, it was normal to see warm water species in the Long Island Sound in summer and early fall, but rather than coming and going, these fish are now year-round residents. More:

<https://www.fisheries.noaa.gov/feature-story/juvenile-fish-communities-are-transition-long-island-sound-reef>.

The mangroves don't smell right to fish

Chemical cues and their importance are not well understood in marine systems, but cues from coastal vegetation such as mangroves can provide sensory information guiding fish to key resources or habitats. Researchers have found that juvenile fishes from the Caribbean (Belize) and Indo-Pacific (Fiji) were attracted to cues from mangrove leaves and were more attracted to cues from mangroves distant from human settlement. In the field, reefs supplemented with mangrove leaves grown away from humans attracted more fish recruits from a greater diversity of species than reefs supplemented with leaves grown near humans. It appears that human use of coastal areas alters natural chemical cues, negatively affecting the behavioural responses of larval fishes and potentially suppressing recruitment. Read more of this research by Brooker and others in *Nature: Scientific Reports*: <https://www.nature.com/articles/s41598-020-77722-7> [Open access].



Mangroves in even lightly inhabited areas smell different and are less attractive to fish. Photo: [freeaussiaestock.com](https://www.freeaussiaestock.com) is licensed under a Creative Commons Attribution 3.0 Unported License.

The importance of mangroves to fishers

Worldwide, 38 percent of all small-scale fishers (which equates to about 4.1 million people) across 109 countries and territories fish in mangroves and their adjacent waters on a subsistence, small-scale, and near-shore commercial basis. A study has also found that some areas of mangroves are subject to very high fishing intensity with over 7 percent of the world's mangroves supporting more than 5,000 fisher-days per year for every square kilometre of mangroves. Loss and degradation of mangroves detrimentally influences fish populations and therefore the livelihoods and food security for many of the world's most vulnerable communities. More on this research by zu Ermgassen and others in *Estuarine, Coast and Shelf Science*: <https://www.sciencedirect.com/science/article/pii/S027277142030706X> [Open access].

Softening shorelines helping Muskegon Lake fish and the local economy

The lower Muskegon River watershed is a drowned river mouth that flows into Lake Michigan in Michigan, USA. Historic sawmill debris, foundry sand and slag filled 798 acres (25 percent), of Muskegon Lake's open water and emergent wetlands, and 74 percent of the shoreline was hardened with wood pilings, sheet metal and concrete. Restoration projects have removed nearly 26 acres of sediment and mill debris, softened 7,000 feet of shoreline, re-established fish passage, and reconnected and restored more than 65 acres of emergent wetlands and 44 acres of open water wetlands. While good for fish, this work is also providing benefits for the local community. The total value of additional recreation following restoration was estimated at US\$27.9 million annually. More: <https://www.glc.org/work/aocs/muskegon>.

Flood destruction benefits fish

After a significant rain event, the Willow and Kettle Rivers in eastern Minnesota, USA, flooded and an 80-year-old dam was irreparably damaged. Instead of just replacing the dam wall as it was prior to the flood, a rock-ramp fishway has been incorporated into the build, providing fish passage past the dam wall and access to upstream habitats. More: <https://www.stcroix360.com/2021/01/replacing-damaged-dam-restores-fish-habitat-and-a-popular-lake/>.

They've got habitat in their eyes

Using a unique technique for freshwater fish, researchers have used stable isotopic analysis of the eye lenses to reveal a fish's life history and what it ate along the way. Much like tree rings, the lenses in fish eyeballs grow in layers throughout a fish's life, recording chemical signatures of the habitats used while each layer was forming and locking in the dietary value of what the fish ate in each habitat. Stable isotopes are forms of atoms that do not decay into other elements and are incorporated into a fish's tissue through its diet. They can be used to trace origins, food webs and migratory patterns of species. More: <https://www.britishecologicalsociety.org/eyes-reveal-life-history-of-fish/> or the research by Bell and others in *Methods Ecology and Evolution*: <https://doi.org/10.1111/2041-210X.13543>.

Bull Trout, off-road vehicles, and habitat restoration

Fall Creek in Alberta, Canada, provides important spawning and rearing habitat for Bull Trout. However, unmanaged off-road vehicle use in this area has increased bank and soil erosion resulting in increased sedimentation which negatively impacts food availability, spawning habitat, and egg development. Monitoring of the stream restoration work that was completed in 2018 found off-road vehicle damage to two stream crossings and where new trails had been created. To help deter future off-road vehicle use, and slow runoff to the creek, the disturbed areas were "roughened up", and coarse woody debris was distributed over the reclamation area and along trails leading to the stream crossing. More: <https://tucanada.org/fall-creek-update/>.



A variety of bioengineering techniques, such as willow staking, willow wattle fences, log walls, and seeding was used to improve bank stability and reclaim stream crossings. Photo: Trout Unlimited Canada.

Bull Trout found in a re-connected Sun Creek

More than 100 years ago, agricultural development disconnected the natural link between Sun Creek in Klamath County, USA, and its headwaters in the Crater Lake National Park and the Wood River. This hampered migratory fish species like the Bull Trout. A population of Bull Trout was present in Sun Creek but was struggling due to competition with non-native Trout and disconnection from its historic habitat. In 2017, a project to re-connect the Sun Creek was completed, included rehabilitation of 2 miles of waterway using techniques such as the installation of woody debris and planting riparian areas. A few months ago, monitoring found the first Bull Trout in this reconnected reach, indicating that at least some of these fish are finding their way into their traditional habitat. More: <https://www.klamathfallsnews.org/news/threatened-fish-discovery-in-sun-creek-an-important-milestone-in-decades-of-restoration>.

Wood banks for fish habitat

The restoration of in-stream habitat often faces two challenges: the lack of woody debris in waterways and how to source suitable wood for rehabilitation projects. The 'Instream Wood Bank Network' operating in The Cascades in Washington State, USA, is overcoming these challenges by stockpiling fallen trees, logs and other non-saleable wood from forest management operations and storing it in accessible locations ready to be deployed for fish habitat restoration projects. More: http://www.chronline.com/news/new-initiative-hopes-to-aid-fish-populations/article_aa949428-463f-11eb-bc37-f77cb192d5de.html.

RESOURCES

Unpack Habitat

A series exploring key fish habitats:

- Snags and resnagging (<https://ozfish.org.au/2021/01/snags-and-resnagging/>)
- Seagrasses (<https://ozfish.org.au/2021/01/unpack-habitat-seagrasses/>)
- Shellfish Reefs (<https://ozfish.org.au/2020/12/unpack-habitat-shellfish-reefs/>)
- Coral Reefs (<https://ozfish.org.au/2020/12/unpack-habitat-coral-reefs/>)

Salmon in the Pacific Northwest

An essay on Salmon species, their life history and habitat, and the story of the fishery: <https://www.historylink.org/File/10443>.

Explorers: Wild about wildlife on the seashore

Videos exploring the animals on sandy and rocky shores around Ireland: <https://www.rte.ie/learn/home-school-hub/2021/0114/1189751-explorers-wild-about-wildlife-on-the-seashore/>.

What do fish do in the winter?

Part 1: Rivers <https://tucanada.org/what-do-fish-do-in-the-winter-part-1-rivers/>.

Part 2 Lakes <https://tucanada.org/what-do-fish-do-in-the-winter-part-2-lakes/>.

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

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