#60, September 2017

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

Never too wet and cold to help fish

Volunteers from the Victorian Fly Fishing Association were among those who braved unpleasantly cold and wet conditions to add hundreds of tree and shrub seedlings to those already planted along the Little River at Taggerty, Victoria. This is a good time of the year to plant native plants in this region as it gives them a chance to establish their root systems over spring before having to survive the dry and heat of summer. The plantings will improve the health of the river over time, providing shade and a natural supply of branches and leaf litter to the river, which will provide important habitat and food for fish. More: https://www.gbcma.vic.gov.au/news_events/big-day-out-to-improve-the-health-of-little-river.html.

Cold and wet volunteers were rewarded for their fish habitat improvement efforts with hot soup and a barbeque. Photo: GBCMA.

Fish passage on the Fitzroy

Central Queensland's Fitzroy Basin has many of the roads, dams and weirs that can prevent fish migrating between fresh and salt water to complete their life cycle. The installation of two more fishways, one at Moores Creek and the other at the Rockhampton Barrage, are improving fish access to habitat, especially to important upstream freshwater systems. The Barrage originally had a fishway based on designs for salmonid fish and it was not effective. An upgrade in the 1990s to a vertical slot fishway improved passage at some tide-levels. The recent upgrade has been to a cone style fishway, which wraps around the vertical slot area and has improved its effectiveness 10-fold. A video shows the fishways in action and explains why they are important for fish in the Fitzroy Basin: https://www.youtube.com/watch?v=v4ilr9Zwzps.

The new cone style fishway at the Rockhampton Barrage is now seeing over 400 fish a minute bypass the barrier. Photo: Extracted from video, Fitzroy Basin association.

A modern midden to re-create a reef

A pile of oyster shell is growing at the Ningi waste transfer station near Bribie Island, Queensland, thanks to local restaurants and residents keen to see the oyster reefs restored in Pumicestone Passage. Now diverted from waste streams, the shells are being converted back to a raw material to rebuild shellfish reefs and provide habitat for many species of fish. Exploitation, dredging and sediment run-off from land development destroyed the area's once-extensive shellfish reefs. More: http://www.abc.net.au/news/2017-07-12/oyster-recycling-reef-restoration-pumicestone-passage/8697822.

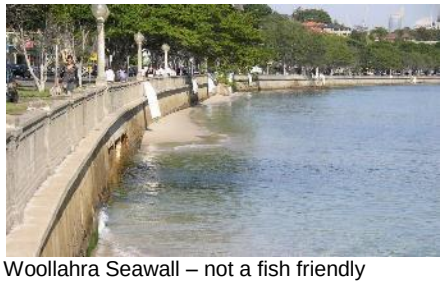
Future fish habitat. Photo: ABC Rural, Jennifer Nichols.

Coorong and Lower Lakes fish responding to flows

The 2016 high flow event in South Australia's Coorong and Lower Lakes peaked at 95 gigalitres per day, the highest flow in 23 years. The flow helped flush salt from the river and poured through the barrages and fishways, allowing many fish species to migrate easily upstream and downstream, to spawn and feed. Monitoring has found the greatest numbers of small-bodied fish using the fishways at the Lower Murray barrages since 2010-2011. A total of 1.78 million fish, from 27 species were identified. Most were fish were Sandy Sprat and juvenile Congolli. Recent monitoring has also found increased numbers and distribution of Murray Hardyhead and Southern Pygmy Perch, indicating that the Lower Lakes environment is slowly recovering from the Millennium Drought. More: http://www.environment.sa.gov.au/Home/Full_newsevents_listing/News_Events_Listing/170717-coorong-fish-populations and http://www.environment.sa.gov.au/Home/Full_newsevents_listing/News_Events_Listing/170801-improved-threatened-population.

Fish-friendly marine infrastructure

A project collating information about new on-ground works, research and design options to ensure marine infrastructure is fish-friendly has been finalised. Marine infrastructure includes structures such as pontoons, jetties, marinas, boat moorings and seawalls. While usually installed to provide access to and storage for boats, to control erosion and to protect coastal assets, they can have a negative influence on the health and productivity of local fisheries. New concepts in marine infrastructure design, and alternatives to traditional construction and management techniques, provide opportunities to enhance habitat for marine life in and around these structures. Some examples are provided here: http://www.fishhabitatnetwork.com.au/projects/fish-friendly-marine-infrastructure. This collection complements the report *Guiding Principles for Marine Foreshore Developments*, which provides guiding principles for ecologically sustainable design of marine foreshore development.



Woollahra Seawall – not a fish friendly structure. Photo: NSW DPI.

A more fish-friendly approach at Claydon Reserve, Botany Bay, NSW. Photo: NSW DPI.

WA reefs rich in fish

Researchers assessed the fish communities associated with north-west Australia's deeper and more inaccessible reefs have found they are a major reservoir of marine biodiversity, with unique and exceptionally high fish diversity and abundance. The number of fish species was 1.4 times that recorded for similar habitats on the Great Barrier Reef. Sites most exposed to the prevailing currents (facing north-east) had lowest fish abundance, while highest abundances were recorded on moderately exposed sites (along the north-west and south-east edges). Read more of this work by Moore and others in *Coral Reefs*: https://doi.org/10.1007/s00338-017-1564-y.

Among the most abundant species was Unicornfish. Photo: Bernard Dupont, Flickr. License: CC BY Attribution-ShareAlike

Popular media reveals changes in recreational fish and fishing

A review of 140 years' worth of popular media records about fish and fishing in the Noosa River estuary, Queensland, has revealed a century of diminishing returns to all but the most skilled or dedicated of recreational fishers. Catch rates between 1900 and 1998 declined from an average of 32.5 fish per trip to 18.8 fish per trip. Read more of this review by Thurstan and others in *PLoS ONE* [Open access]: https://doi.org/10.1371/journal.pone.0182345.

A similar project documented the 70 per cent decline over the past 80 years of the Queensland east coast Spanish Mackerel spawning fishery. More: https://www.coralcoe.org.au/media-releases/fishery-history-highlights-substantial-declines.

A light at the end of the Carp tunnel

Carp can make up over 80 per cent of the total weight of fish in some Australian rivers, so if the various strategies being explored under the National Carp Control Plan are successful, there might be large amounts of Carp waste to deal with. Researchers found that the collagen in fish scales has a piezoelectric quality, so when the scales are bent mechanically a small electrical charge is created. Enough energy can be harnessed to power LED lights or medical devices such as pacemakers, for example. More on this story: http://www.weeklytimesnow.com.au/news/national/carp-scales-could-be-used-to-generate-energy/news-story/8f86ccf0d14c6d44a6a9f3fcac85bf84 Detail about the power from fish scales research: https://publishing.aip.org/publishing/journal-highlights/fish-biowaste-converted-piezoelectric-energy-harvesters.

Saltmarsh facing another threat

The value of saltmarsh habitat as a source of food for fish and prawns is well known, so land managers are viewing the growing threat associated with Sicilian Sea Lavender with concern. While not yet listed as a Weed of National Significance, it is considered a high risk weed in saltmarsh areas. It can destroy the native vegetation and is now threatening large areas of coastline in eastern Victoria. It has also been found in areas along the NSW central coast, where eradication activities are underway. It is easily spread and the seeds can survive long periods in seawater. More information about this weed: https://www.australisbiological.com.au/wp-content/uploads/2012/03/Limonium-presentation-Philip-Island-12-September-2012.pdf.

Sicilian Sea Lavender – destroying the saltmarsh that helps provide fish with food. Photo: Robin Adair.

Bridges to benefit fish and fishers!


A perforated metal grate on the surface and baffles to slow water underneath mean that these new bridges enable fish to migrate in a variety of conditions. Photo: NECMA.

Flood-damaged old gravel and rock crossings have been blocking the migration of native fish along Boundary Creek, an anabranch of the Ovens River, north-east Victoria. New low-level bridges and fish passages have been built to enable fish to move into and out of this important habitat area. The Boundary Creek anabranch runs about 15 kilometres along the Ovens River, connecting to floodplain habitats which, when inundated, provide an abundance of habitat and resources such as food and shelter. As fish are often reluctant to swim into a dark tunnel, the bridges have perforated metal grates to let light penetrate to the water below. Cement baffles (stumps) have also been installed underneath the bridges to help break the flow of water to create eddies and refuges for fish to access and have a rest. These bridges not only provide much improved fish passage but also better access to favourite fishing areas. More: http://www.necma.vic.gov.au/News-Events/News/ArtMID/431/ArticleID/356/Fish-passages-for-the-Warby-Ovens-National-Park or a video: https://www.youtube.com/watch?v=BQMaAhlt5sI.

SOI and seaweed both influence the Emperors

Spangled Emperor was one of three tropical fish species researchers studied to better understand the impact of the interaction between seaweed habitat and the Southern Oscillation Index (SOI) on fish recruitment. The researchers found that new fish recruits and juveniles of all species were almost exclusively found in seaweed nursery habitats, while adults of two of these species were predominantly found on adjacent coral reefs. They also found that local rates of recruitment were generally poor predictors of older juvenile abundance. Juvenile abundance was more closely related to structural characteristics of seaweed habitat. The number of predators present was also a factor. Read more of this work by Wilson and others in *Limnology and Oceanography*: https://doi.org/10.1002/lno.10540.

INTERNATIONAL NEWS

A US$2billion treaty violation is all about fish

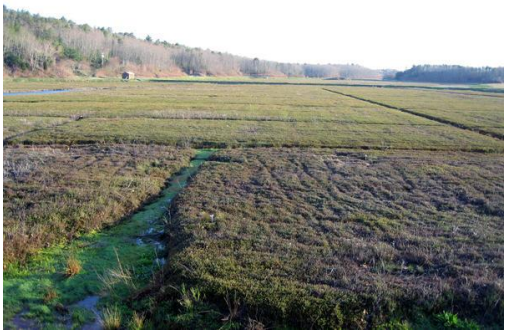
Undersized culverts in the state of Washington have been found to be in violation of federal treaty obligations, so the state, having lost an appeal, has been ordered to remove or replace approximately 1000 culverts at an estimated cost of nearly US$2 billion. The treaty between the US government and Native American tribes of the Pacific Northwest was signed in the mid-1880s, guaranteeing in perpetuity fishing rights and respect for cultural traditions centred around fishing. However, numerous practices that depleted fish stocks had proceeded almost unabated, including the installation of barriers to fish migration. Now, after fifteen years of legal process, the state has to restore fish passage, opening up hundreds of miles of habitat for Salmon. In its appeal, the state argued that spending money on culverts 'would make no difference' and that 'its treaties with the tribes created no obligation to restore salmon habitat'. Read more: https://www.usnews.com/news/best-states/washington/articles/2017-05-19/appeals-court-declines-to-reconsider-salmon-culverts-case .

Steelhead suffering from hot water pollution

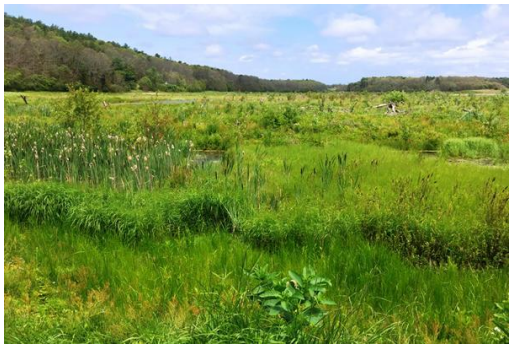
Steelhead in the Columbia and Snake rivers, north-western USA, are struggling to cope with high water temperatures in several dams as they attempt to migrate upstream to spawning areas. A record summer heat wave means water temperature in the dams has been above 70 degrees (21 degrees Celsius) for days on end and in water this warm or warmer, both Pacific Salmon and Steelhead tend to slow down, or stop migrating altogether, and their susceptibility to disease increases. Only about 400 Steelhead had crossed Lower Granite Dam on the Snake River, a precipitous drop from the 10-year average of more than 6,000 Steelhead over the dam near Lewiston, Idaho. Climate change is exacerbating the warm water problem, with hot weather starting earlier and lasting longer, and winter seeing less snow and more rain. More: http://www.seattletimes.com/seattle-news/steelhead-struggling-home-in-record-low-numbers/.

The un-making of a cranberry bog brings the fish back

The Tidmarsh, in Massachusetts, USA, had been in use as a cranberry bog since the 1890s, created by cutting down forested wetlands, draining the swamp and channelizing the streams. Barriers were erected to trap water and control flow, preventing fish from swimming through to reach their upstream habitat. The restoration to a tidal marsh started with the removal of barriers, re-connecting the headwaters to the sea for the first time in more than 100 years. 15 years later, 225 acres of wetland habitat and more than three miles of stream channel have been restored. Before restoration, fish like alewife and blueback herring were rarely seen in the bog. In 2016, thousands were swimming beyond the former barriers. More: http://www.habitat.noaa.gov/highlights/returningacranberrybogtoathrivingwetland.html.



The drainage lines for the cranberry farm can be seen clearly. Photo: Alex Hackman.



The same area after restoration. Photo: Alex Hackman.

The impacts of ‘ocean sprawl’

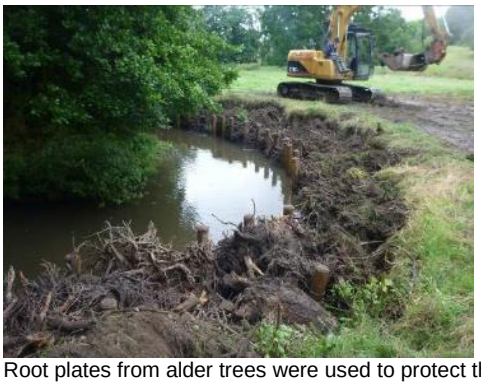
‘Ocean sprawl’ is the name given to development and construction in the marine and coastal environment that causes the loss or transformation of habitat. A review has focussed on the impacts of ocean sprawl, and specifically artificial structures, on the marine sediments that are biodiverse, crucial to fisheries productivity, and major sites of nutrient transformation. Artificial structures negatively impact marine sedimentary habitats in a variety of ways, including destruction, modification of light and sound conditions, contamination and changing how water moves in these areas. Read more of this review by Heery and others in *Journal of Experimental Marine Biology and Ecology*: https://doi.org/10.1016/j.jembe.2017.01.020 [Open access]. This article is one of a special issue of the journal ‘Ecological responses to environmental change in marine systems’ available here: http://www.sciencedirect.com/science/journal/00220981/492/supp/C?sdc=1.

How does 3 billion gallons of water for Trout sound?

Water rights representing approximately 3 billion gallons of water have been donated to Trout Unlimited to permanently protect vital fish habitat in tributaries of the Yellowstone River. This agreement will help keep more water in the river, providing cooler temperatures in the height of summer and better habitat for fish and other wildlife. More: https://yellowstoneinsider.com/2017/08/17/kinross-gold-inc-donates-former-mineral-hill-mine-trout-unlimited-rocky-mountain-elk-foundation/.

A weir every 40 metres – not anymore

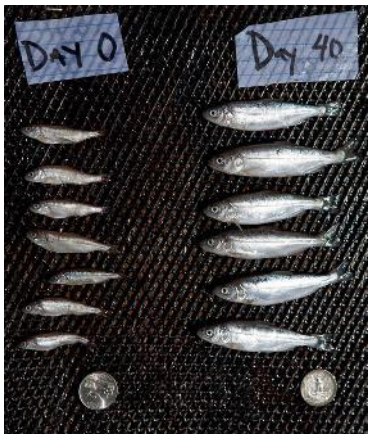
Brailsford Brook in Derbyshire, UK, had, until recently, over 40 weirs, approximately one every 40 metres. Originally installed to create a series of fishable pools, they were disrupting the natural functioning of the Brook and the pools were silted up. Over the last year, several weirs have been removed and on-ground works completed to increase the stability of the banks. In a nice re-use of materials between restoration projects, alder root plates from trees being removed from a nearby lake restoration project were used to stabilise the outside of a meander bend. The root plates were positioned to create a new bank line, providing great cover for fish around the outside of the bend. The increased stability will lower the river bed level through scour, deepening the pool and creating good adult trout habitat. More: http://www.wildtrout.org/news/brailsford-brook-follow-work.



Root plates from alder trees were used to protect the outside of a meander bend. These will promote bed scour and deepening of the pool, making it more suitable for larger trout. Photo: Wild Trout Trust.

Floodplain farms can be good for juvenile Chinook Salmon

In the Central Valley of California, USA, less than 5% of floodplain wetland habitats remain, the areas having been extensively leveed and drained for flood control and agriculture. Researchers manipulated watering regimes to see if farmland occupying the historical floodplains could be better managed to provide benefits for native fish. Approximately 10,000 juvenile Chinook Salmon were reared in fields that had been intentionally flooded after the autumn rice harvest. The fish were found to have among the highest individual growth rates recorded in fresh water in California. It appears the fish had been feasting on water fleas. The research suggests the compatibility, on the same farm fields, of summer crop production and native fish habitat during winter. Read more of this research by Katz and others in PLoS ONE [Open access]: https://doi.org/10.1371/journal.pone.0177409 .



Rice fields are providing good feeding habitat for juvenile Chinook Salmon. Photo: Max Whittaker.

A focus on habitat as well as fish passage needed

The impact of weirs and dams on fish migration is well recognised, however, the impact of these structures on the habitats that freshwater fish need is also an important consideration. Researchers argue that such habitat loss is particularly important in the lowland waterways of Europe. They have reviewed the loss in habitat as a result of barriers in lowland streams and rivers, and the repercussions that such alterations may have on fish populations, using Denmark as the focus. The riverine landscape in Denmark has been modified heavily and ensuring long-term fish populations may need to address these broader impacts, rather than focussing on fish passage on its own. Read more of this work by Birnie-Gauvin and others in *Aquatic Conservation*: https://doi.org/10.1002/aqc.2795.

Stocking baitfish to help seagrass

Pinfish – baitfish being released not to feed fish but to help seagrass. Photo: Leah Voss.

Pinfish have been tagged and released into Indian River Lagoon, near Stuart, Florida, USA, to see if their habit of eating the epiphytes that grow on seagrass help the seagrass restoration projects that are underway. Cleaning the blades helps the seagrass photosynthesise more efficiently. Seagrass beds, the home of juvenile game fish, such as Snook, Tarpon, Redfish and Sea Trout, have been lost or diminished by massive discharges of water from Lake Okeechobee every few years. Algae blooms have also destroyed about 47,000 acres of seagrass. The tagged fish will be monitored to see if they stay on their new seagrass bed and help it grow. More: http://www.tcpalm.com/story/news/local/indian-river-lagoon/health/2017/08/17/tagged-pinfish-released-into-indian-river-lagoon-study-popular-bait-fishs-life-cycle/574210001/.

RESOURCES

Wetland Technical Design Guidelines

This document guides designers of wetlands aiming to both manage urban stormwater hydrology and quality, and provide multiple benefits to the community.
http://www.hlw.org.au/u/lib/mob/20170530131525_2632c5a65b696f6b1/wetlands-guidelines-final-v1.pdf

Green infrastructure effectiveness database

An online database of literature sources containing information on the effectiveness of 32 different coastal green infrastructure types that aim to reduce the impacts of coastal hazards, such as inundation, more frequent rain events, and sea level rise. The database contains records from a wide range of sources, such as peer-reviewed journals, online tools, and grey literature: https://coast.noaa.gov/digitalcoast/training/gi-database.html

HydroCalculator – analysis of hydro-project feasibility

The HydroCalculator is a free on-line tool enabling a basic analysis of the economic feasibility of hydro projects as well as calculating some simple environmental and social indicators that can be compared to those of other dams. More information, past analyses and access to the tool here: http://www.conservation-strategy.org/en/hydrocalculator-analyses.

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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Recreational Fishing Trusts

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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.ffsaq.com.au

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

NSW Fishing Clubs Association www.nswfca.com.au

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

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

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