

Newstreams

A NSW DPI newsletter for recreational fishers and others interested in improving fish habitat to build native fish stocks

No 2. May 2006

About Newstreams

Newstreams is an email newsletter to keep people up to date about NSW fish habitat activities, and about important aquatic habitat developments in Australia and around the world. It is published electronically every two months by NSW Department of Primary Industries. In NSW many estuarine and freshwater habitats for juvenile and adult fish have been degraded or lost through urban, industrial and agricultural development. Communities around NSW are now working actively to restore fish habitat.

MANAGEMENT AND ONGROUND WORKS

Richmond River fish kills and water quality

Following two major fish kills in December 2005 and January 2006, the north coast community has established an expert technical committee to analyse the risks of certain areas producing poor water quality and fish kills in the Richmond catchment. A meeting in March of government agencies, commercial and recreational fishers and businesses affected by the poor river water quality established the committee and designed a sub-catchment report card for water quality issues. The risk assessment table and report card will be discussed at a second community meeting to be held this month. For more information, contact Simon Walsh on 02 6626 1256 or simon.walsh@dpi.nsw.gov.au

MDBC demonstration reach workshop

The Murray Darling Basin Commission hosted a demonstration reach workshop in April to further develop the concept of demonstration reaches in the Murray-Darling Basin. Demonstration reaches are large-scale river reaches where a number of management techniques are applied to show the benefits of river rehabilitation on native fish populations. Proceedings from the workshop will be available later this year. For more details contact NSW Native Fish Strategy coordinator Sharon Molloy at sharon.molloy@dpi.nsw.gov.au.

Barriers to fish passage in the Namoi catchment

A new report on barriers to fish passage in the Namoi catchment found that 162 of the catchment's 496 instream structures significantly impeded the passage of native fish. Of these, 31 structures (nine causeways, eight weirs, five fords, five water gauge structures, three culverts and one water-supply pipe) required immediate remediation. Options include removal of sediment and debris, structural modification and, in some cases, complete removal and replacement. Read the report at http://www.fisheries.nsw.gov.au/__data/assets/pdf_file/61315/NamoiReportweb.pdf

Fish passage improved at Mullumbimby

Before its redesign, the road crossing at Coral Avenue, Mullumbimby was the highest priority barrier to fish passage in the northern rivers region. Byron Shire Council inserted a single span, prefabricated Doolan Deck Bridge to replace the piped causeway barrier at the tidal limit of the Cape Byron Marine Park, thereby improving fish passage to 25 km of upstream habitat in the Brunswick River. The total cost of the project was \$260 000, with contributions coming from Byron Shire Council, Natural Heritage Trust, the Northern Rivers CMA, the Recreational Fishing Trust, and the Cape Byron Marine Park Authority. More information: http://www.northern.cma.nsw.gov.au/pdf/media_fishpassagecapebyron.pdf.

River crossing prosecution

A South Coast landholder who built an unauthorised concrete, earth and rock causeway across the Deua River near Moruya was fined \$1000 for obstructing fish passage and directed to remove all the material from the river channel. The Deua River has a strong population of migratory fish including bass and Australian grayling partly because of the absence of in-stream barriers. The landholder has

been advised to seek advice from DPI, Eurobodalla Shire Council and DNR before building any replacement structure. For more information contact Allan Lugg at allan.lugg@dpi.nsw.gov.au

Fewer floods lead to degraded marshes

Long gaps between flood events have a degrading effect on floodplain health according to UNE researcher Kim Jenkins, who has written a report for the former State Wetlands Advisory Committee on the links between flow & aquatic productivity, diversity & food web structure in the Macquarie Marshes. She used the 2004 floods to compare responses of habitats last flooded in 1990, 2000 and 2003. She found that the 1990 habitats had reduced organic matter in the flood sediments, lower dissolved oxygen in the flood water, and lower numbers of microinvertebrates, suggesting that viable eggs are lost from floodplain sediments as the period of drying increases. To obtain a copy of the report, email Rebecca Lines-Kelly at rebecca.lines-kelly@dpi.nsw.gov.au.

Tide to Table: A new program to restore fish habitat

Tide to Table is a new program to rehabilitate fish habitat and improve water quality through on-ground projects at more than 20 sites across Sydney. The works include limiting 4WD access to sites, removing weeds and replanting in/around riparian zones, installing stormwater control devices, removing barriers to fish passage, stabilising fragile ecological communities and value-adding to existing waterway projects. The program is a partnership between the Sydney Metropolitan CMA and Ocean Watch Australia, and works closely with Bushcare and local government groups in the catchment. It is funded under the Commonwealth National Landcare Program. Further information: http://www.oceanwatch.org.au/OW_410.asp?intID_GD=756.

RESEARCH

Automatic carp cage

A cage that operates on fishways to separate native fish from carp using the carp's jumping ability, has now been recommended for use in an automatic version. Trials of the Williams Carp cage successfully separated 83% of adult carp into a confined area. In contrast, more than 99.9% of 19 641 native fish passed through the cage and exited the fishway. The co-operative project involved researchers from the Arthur Rylah Institute and Goulburn Murray Water weir keepers, with funding and support from the Murray-Darling Basin Commission. A cage has already been adopted at Lock 15 fishway (Euston Weir), and planning for more cages at the four new Murray fishways (Locks 7, 8, 9 & 10) is progressing well. Read the final report at http://www.mdbc.gov.au/__data/page/652/Carp-cage-final-report.pdf.

Undershot weirs reduce larvae survival

Undershot gated weirs are a greater threat to fish larvae than overshot weirs according to new research from Narrandera Fisheries Centre. Overshot weirs discharge water over the crest, creating a plunging flow effect where water falls either vertically or down a sloping spillway. Water released from undershot weirs travels below the gates and often creates turbulent downstream conditions. Trials showed that an undershot weir killed almost all the golden perch larvae and more than half the Murray cod larvae that passed through the weir. Mortality rates from the overshot weir were much lower. The relatively large number of undershot weirs within the known distribution of these species could affect recruitment over a large scale. Read the paper by Baumgartner et al in *Marine & Freshwater Research* 2006 (57) 187-91 or at <http://www.publish.csiro.au/nid/126/paper/MF05098.htm>.

Cod spawning findings

Research into spawning of Murray cod and trout cod in the Murray and Ovens rivers between 1994 and 1996 found that spawning occurred regularly under a range of flow conditions, so it is likely that recruitment is driven by factors that affect larvae and juveniles. Spawning began in October once water temperatures exceeded 15C, with Murray cod larvae present for up to ten weeks, and trout cod larvae for only two weeks. Peak larval abundances occurred in November, but varied significantly between sites, samples and years. Trout cod larvae were significantly larger than Murray cod larvae in both years. Read the full paper by Koehn and Harrington in *River Research and Applications* December 2005 at <http://www3.interscience.wiley.com/cgi-bin/abstract/112204770/ABSTRACT>.

Cold water releases threaten Murray cod

Cold water releases from dams are a significant threatening process to Murray cod populations according to a new study that looked specifically at the Mitta Mitta River downstream from the Dartmouth Dam. Before the dam was built in 1978 the Murray cod were endemic to the river, but have

not been seen since 1992. The study found cod larvae and eggs do not survive below 13C, and some downstream river temperatures are now 10-12C below normal. The study calls for incremental temperature increases in released water to minimise impact on downstream fish populations. Read the paper by Todd *et al* in the October 2005 issue of *River Research and Applications* or view the abstract at <http://dx.doi.org/10.1002/rra.873>.

Impact of native fish stocking

A new report has called for targeted research on the environmental and ecological risks of stocking streams with hatchery fish. The MDBC-funded report, 'Impacts of native fish stocking on fish within the Murray-Darling Basin' says stocking usually occurs when fish numbers have been reduced through environmental degradation or overfishing, and that these issues need to be looked at before restocking. Risks of restocking include changes to abundance and behaviour of wild fish, genetic changes, introduction of diseases, parasites and exotic organisms, and ecosystem alteration. To obtain a copy of the report, email Rebecca Lines-Kelly at rebecca.lines-kelly@dpi.nsw.gov.au

Impact of irrigation on native fish

NSW DPI is currently working with the Australian Cotton CRC and Murrumbidgee Irrigation to see whether water extraction for irrigation removes fish from main river systems. Researchers are looking at the impact of extraction on different species and size classes, the impact at different times of the year, and the fate of fish once they are extracted. Results will help improve management practices for irrigation systems. Tagging studies will determine whether fish are able to return to main river systems after they have been extracted. Tags are yellow and easily visible if a fish is captured. Anglers are encouraged to report any tagged fish to the NSW DPI tagging hotline on 1800 185 027. If you'd like to know more go to http://www.fisheries.nsw.gov.au/science/scientific_outputs/aqua-eco/baumgartner_-_fish_617.

Are rising sea levels promoting mangroves?

A NSW study suggests that the steady encroachment of mangroves into saltmarsh since European settlement may be due to rising sea levels inundating saltmarsh and hence providing suitable environment for the mangroves. This has serious implications for the protection of fish habitat into the future with the need to ensure that higher land next to wetlands is protected as the fish habitat of the future. Read the paper by Rogers *et al* in *Estuarine, Coastal and Shelf Science*, February 2006 or view the abstract at [doi:10.1016/j.ecss.2005.11.004](https://doi.org/10.1016/j.ecss.2005.11.004).

INTERNATIONAL NEWS

US fish habitat action plan

The US national fish habitat plan was launched at the North American wildlife and natural resources conference in March. The plan's goals are to:

- protect and maintain intact and healthy aquatic systems
- prevent further degradation of fish habitats that have been adversely affected
- reverse declines in the quality and quantity of aquatic habitats to improve the overall health of fish and other aquatic organisms
- increase the quality and quantity of fish habitats that support a broad natural diversity of fish and other aquatic species.

Find out more at <http://www.fishhabitat.org/plan/default.htm>.

Human activity changes fish communities

Chilean research has found that use of river water for drinking, irrigation, sewage effluent discharge, hydropower generation and industry has reduced fish species richness, diversity and abundance. With loss of native species there has been an increase introduced species such as gambusia and carp, suggesting a large-scale and long-term effect of human impacts on the river in the past decade. Read the paper 'Response of the fish community to human-induced changes in the Biobio River in Chile', in at the January 2006 edition of *Freshwater Biology* or view the abstract at [doi/abs/10.1111/j.1365-2427.2005.01461.x](https://doi.org/10.1111/j.1365-2427.2005.01461.x).

Fish use of coastal realignments

The UK is increasingly realigning its coastal defences, opening up dikes and sea walls to dissipate wave energy. Researchers have found that fish colonise the restored saltmarsh every time the tide reaches the creeks, with the saltmarsh particularly well used by larval and juvenile fish. Read the

abstract of the paper 'Fish utilisation of managed realignments' in *Fisheries Management & Ecology* December 2005 or view the abstract at <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-2400.2005.00467.x>.

Juvenile trout affected by substrate, vegetation and temperature

A US study into how habitat affects juvenile trout found that populations were greatly affected by the amount of gravel substrate and aquatic vegetation, and by the water temperature. The study concludes that stocking programs should focus on areas where juveniles can survive and that if such areas are not available, managers should instead invest effort in enhancing or creating suitable habitat. Read the *Transactions of the American Fisheries Society* abstract at <http://afs.allenpress.com/perlserv/?request=get-abstract&doi=10.1577%2FFFT-03-160.1>

Essential fish habitat

A US paper looking at essential fish habitat has defined it as habitat that has significant impacts on vital rates of sensitive life history stages. Small changes in the quantity or quality of such habitat will have large impacts on population dynamics, so it is these habitats we should identify and protect. Read the paper by Levin & Stunz in the July 2005 edition of in *Estuarine, Coastal and Shelf Science*, or view the abstract at doi:10.1016/j.ecss.2005.02.007.

FISH HABITAT INFORMATION RESOURCES

New CD guide to the freshwater crayfishes of north-eastern NSW

This CD field guide combines clear, diagnostic photographs with biological profiles for NSW coastal crayfish species north of Grafton/Glen Innes. More information at <http://www.croakingenvironment.com.au/products/natureguides.html>.

Wetland restoration review

A review of international coastal wetland restoration has found that Australians restore wetlands to compensate for environmental damage, remediate acid sulfate soils, and enhance migratory bird habitat. International motivations for restoration include sediment replacement, mudflat creation, wetland banking and flood risk reduction. UNSW researcher Will Glamore visited USA, Holland, Vietnam and New Zealand last year on a Churchill Fellowship to compare and contrast wetland restoration practices. Read his report at http://www.wetlandlink.com.au/downloads/research/Churchill-Report_wglamore.pdf; and a summary at <http://www.wetlandlink.com.au/content/review-of-international-coastal-wetland-restoration-practices>.

Guide to incorporating coastal and marine issues in NRM planning

This new guide, produced by the Marine and Coastal Community Network is aimed at helping regional NRM groups incorporate coastal and marine considerations into their planning activities. To order your copy, contact nat-off@mccn.org.au or download the pdf (1.5 MB) at www.mccn.org.au/content/380/mccn_nrm_guide.pdf

Global review of habitat rehabilitation for inland fisheries

This review found that techniques such as reconnection of isolated habitats, rehabilitation of floodplains and placement of instream structures are effective in improving habitat and increasing local fish abundance. Techniques that restore ecological processes, such as riparian rehabilitation, sediment reduction methods (road improvements), dam removal and restoration of floods, also show promise but may take years to show improvements in fish numbers.

The review found three key areas are lacking in most rehabilitation projects:

- adequate assessment of historic conditions, impaired ecosystem processes and factors limiting biotic production
- understanding upstream or watershed-scale factors that may influence effectiveness of reach or localised rehabilitation
- well designed and funded monitoring and evaluation.

These same factors limit the ability of published studies to determine the success of a given technique at improving habitat conditions or fisheries resources. Find the review at

http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/008/a0039e/a0039e04.htm

Eight habitat principles

A UK paper has proposed a set of eight principles to help people understand habitat and hence improve its management and conservation.

- Habitat can be created by keystone species and interactions among species.
- The productivity of aquatic and riparian habitat is interlinked by reciprocal exchanges of material.
- The riparian zone is fish habitat.
- Fishless headwater streams are inseparable from fish-bearing rivers downstream.
- Habitats can be coupled – in rivers, lakes, estuaries and oceans, and in time.
- Habitats change over hours to centuries.
- Fish production is dynamic due to biocomplexity, in species and in habitats.
- Management and conservation strategies must evolve in response to present conditions, but especially to the anticipated future.

Read the full paper by Naiman and Latterell in the *Journal of Fish Biology* (2005) 67
doi/abs/10.1111/j.0022-1112.2005.00921.x.

Wetland Link

WetlandLink is a newsletter and website resource that provides targeted information to assist landholders with best practices environmental management. More information at <http://www.wetlandlink.com.au/>.

NSW DPI aquatic habitat publications

NSW DPI has published a range of information leaflets and guidelines on aquatic habitat. You can access them at <http://www.fisheries.nsw.gov.au/publications/aquahab.htm>.

FUNDING RESOURCES FOR NSW FISH HABITAT

Community water grants

Round 2 of the Federal Government's community water grants program opens midyear. There are three themes: water use, efficiency and conservation, water reuse and recycling, and improving surface and groundwater health. Current projects include riparian plantings and restoration of billabong health. More information at <http://www.communitywatergrants.gov.au/>.

Environmental Trust

The Trust is offering seven grants programs in 2006/07 totalling \$5.65 million in education, research, and restoration and rehabilitation. Closing dates are staggered, and education and research have a two-stage application process. Details and application forms at <http://www.environment.nsw.gov.au/grants/envtrust.htm>.

Recreational Fishing Trust small grants program

The small grants program enables fishing clubs, councils and other community members to submit proposals for projects aimed at enhancing recreational fishing. Funding proposals are limited to \$5000 per project and should be matched by funds from the applicant and / or other sources. One of the priorities of this program is habitat improvement. Applications can be submitted at any time. http://www.fisheries.nsw.gov.au/recreational/inland/small_grants_program.

About NSW DPI and fish habitat

NSW DPI is responsible for management of, and research into, fish habitat in NSW.

The Department's on-ground works:

- map, prioritise and modify structures that block fish passage
- map and rehabilitate aquatic habitat such as wetlands
- reintroduce snags (large woody debris) into streams
- revegetate streambanks to provide habitat and improve the quality of water running into streams

The Department's research work:

- documents the fish communities associated with different aquatic habitats

- understands the basic biology of key fish species – what they eat, when they breed, what their habitat requirements are
- evaluates management actions to see how effective they have been and what improvements may be possible

The Department's legislative, policy and planning work:

- reviews developments that may impact on fish habitats and negotiate impact reduction and/ or compensatory works
- incorporates aquatic habitat protection requirements into land use planning, water management, and estuary and floodplain management
- helps developers, local councils and other state agencies understand the importance of aquatic habitats for fish and options for ensuring their protection and rehabilitation .

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Website

http://www.fisheries.nsw.gov.au/aquatic_habitats

Send us your news

If you have news about fish habitat activities in your area, we'd like to hear from you. Email Rebecca Lines-Kelly at rebecca.lines-kelly@dpi.nsw.gov.au with your news items and suggestions.

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