

# *Aquatic habitat protection and restoration in NSW (Murray-Darling Basin) — a brief overview*

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## *Habitat rehabilitation*

### **NSW Department of Primary Industries (DPI) Aquatic Habitat Rehabilitation Program**

NSW Fisheries has formalised habitat repair activities within the Fisheries Management Branch, with the creation of the Aquatic Habitat Rehabilitation Program (AHR Program) and the formation of a number of strategic partnerships. This team is responsible for the management of numerous externally funded projects and programs undertaking aquatic habitat rehabilitation in NSW. A number of aquatic habitat rehabilitation initiatives are currently underway. This includes a range of projects aimed at restoring fish habitat and passage through:

- wetland rehabilitation;
- weir removal;
- State Water Fish Passage Agreement;
- fishway construction;
- Environmental Trust projects;
- Catchment Management Authority (Natural Heritage Trust) projects;
- Living Murray Initiative; and
- Aquatic Habitat Rehabilitation Database.

Projects underway at present include:

- Mapping of aquatic habitat from Hume to Yarrawonga as part of a Living Murray Initiative funded riparian and in-stream program. Development of a riparian and in-stream restoration plan is underway.
- Currently managing an Environmental Trust funded project to undertake detailed weir reviews of 40 structures in the Basin. Action statements for these structures will be presented to each of the eight inland CMAs. Seed funding for on-ground works is available for four priority structures across NSW.

- NSW Fisheries recently signed a three-year Memorandum of Understanding (MOU) with State Water to provide technical advice on fish passage improvements. The upgrade of a significant number of State Water assets over the next decade as part of the State Water Total Asset Management Plan will include modifications to restore fish passage and the implementation of an associated monitoring program.
- Currently managing an aquatic health project on behalf of the Lower Murray-Darling CMA entitled 'Identification of possible structural or management options to assist fish migration at Weir 32, Pooncarie and Burtundy Weirs'. A fish passage feasibility study and recommendation report has been submitted to the CMA. NSW DPI has successfully secured investment to install a fishway at Burtundy Weir on the Darling River in 2005.
- As part of the NSW Fisheries managed 'Innovative Fishway Development' project, a fishway has been constructed at Balranald Weir and Environmental Trust funding has been secured to automate the fishway.
- The Aquatic Habitat Rehabilitation team and the Worldwide Fund for Nature are jointly managing an Environmental Trust funded project entitled 'Case studies in environmental restoration via redundant weir removal'.
- To assist with the implementation of the Native Fish Strategy in NSW two State Coordinators have been employed. The coordinators play an important role in liaising with key stakeholders groups in NSW to assist with the promotion and implementation of the Strategy.



## NSW Catchment Management Authorities

Thirteen Catchment Management Authorities were set up in January 2004 — eight of them in the Murray-Darling Basin (MDB), as follows: Border Rivers/Gwydir, Namoi, Western, Central West, Lachlan, Murrumbidgee, Lower Murray-Darling and Murray. The CMA Boards will report directly to the Minister for Infrastructure, Planning and Natural Resources. The CMAs were set up to engage regional communities in key natural resource management issues and one of their primary roles will be the preparation of Catchment Action Plans and associated investment strategies.

## Recreational Fishing Trusts

The Recreational Fishing Freshwater Trust Expenditure Committee (RFFTEC) continues to be a strong supporter of the need for habitat rehabilitation to improve native fish populations. All money raised by the recreational fishing licence in NSW is placed into the Recreational Fishing Trusts and spent on improving recreational fishing in NSW. RFFTEC currently funds a freshwater habitat grant program that allows for local recreational angling groups, and others, to undertake on-ground works activities to enhance aquatic habitat. Projects to date include willow removal, planting of riparian vegetation, and restoration of fish passage.

RFFTEC also supports two conservation manager positions whose role is to undertake fisheries habitat management and deal with conservation issues in inland NSW. The conservation managers liaise with government and non-government organisations, landholders, Catchment Management Authorities, recreational fishing groups and local government to ensure effective management and restoration of fish habitat. They also take part in broad-scale natural resource management in inland NSW and assist in the implementation of the MDBC Native Fish Strategy.

## Stormwater Management Plans

The Government-funded Stormwater Trust has funded the preparation of Stormwater Management Plans in all urban centres greater than 1,000 people, to direct actions to improve water quality in urban areas. Since 2002, up to \$1.5 million has been spent on actions to improve urban water quality, from education to installation of pollutant treatment devices. Several projects have involved urban stream rehabilitation.

## *Habitat protection*

### Fisheries Management Act 1994

The *Fisheries Management Act 1994* is the principal legislative instrument in NSW for the protection of freshwater native fish and fish habitat. The objectives of the Fisheries Management Act are to conserve, develop and share the fishery resources of New South Wales for the benefit of present and future generations, and in particular:

- a) to conserve fish stocks and protect key fish habitats, and
  - b) to conserve threatened species, populations and ecological communities of fish and marine vegetation, and
  - c) to promote ecologically sustainable development, including the conservation of biological diversity,
- and, consistently with these objectives:
- to promote viable commercial fishing and aquaculture industries;
  - to promote quality recreational fishing opportunities; and
  - to appropriately share fisheries resources between the users of those resources;
  - to provide social and economic benefits for the wider community of New South Wales.

To meet these objectives, Part 7 of the Act outlines legislative provisions to protect fish habitat, and Part 7a outlines provisions to protect threatened aquatic species. These provisions are more commonly triggered by the development approval process under the *Environmental Planning and Assessment Act 1979* (EP&A Act).



Part 7 contains the following divisions:

- Div. 1 – Habitat protection plans
- Div. 2 – Aquatic reserves
- Div. 3 – Dredging and reclamation
- Div. 4 – Protection of marine vegetation
- Div. 5 – Protection of spawning grounds
- Div. 6 – Noxious fish (declarations/sale, etc.)
- Div. 7 – Release or importation of fish
- Div. 8 – Miscellaneous – e.g. Fishways/Fish Passage.

Part 7a allows for the following:

- Listing and protection of threatened species, populations and communities (10 in MDB);
- Declaration of critical habitat (no sites listed in MDB);
- Listing of Key threatening processes (5 listed relevant to MDB).

Recovery plans are currently being developed by the DPI for the following species populations and communities listed under Part 7A of the Fisheries Management Act:

- *Endangered Species*
  - Murray hardyhead (*Craterocephalus fluviatilis*)
  - Trout cod (*Maccullochella macquariensis*)
  - River snail (*Notopala sublineata*)
- *Endangered Populations*
  - Western population of the olive perchlet (*Ambassis agassizii*)
  - Western population of the purple spotted gudgeon (*Mogurnda adspersa*)
- *Endangered Ecological Communities*
  - Aquatic ecological community in the natural drainage system of the lower Murray River catchment
  - Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River
- *Vulnerable Species*
  - Silver perch (*Bidyanus bidyanus*)
  - Southern pygmy perch (*Nannoperca australis*)
  - Macquarie perch (*Macquaria australasica*).

The NSW Fisheries Scientific Committee, established under Part 7A of the Fisheries Management Act, has proposed a recommendation to list the aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan river as an endangered ecological community.

Threat abatement plans are currently being developed by the DPI for the following Key Threatening Processes as listed under the Fisheries Management Act:

- The removal of large woody debris.
- The introduction of fish to freshwaters within a river catchment outside their natural range.
- The degradation of native riparian vegetation along NSW watercourses.
- The installation and operation of in-stream structures and other mechanisms that alter natural flow regimes of rivers and streams.
- Hook and line fishing in areas important to the survival of threatened species.

### Threatened Species Conservation Act 1995

Threat abatement plans are currently being developed by the Department of Environment and Conservation (DEC) for the following Key Threatening Processes as listed under the Threatened Species Conservation Act:

- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.
- Clearing of native vegetation.

A Threat Abatement Plan entitled 'Predation by *Gambusia holbrooki* (the plague minnow)' has been prepared by DEC.

### Water Management Act 2000

Water Sharing Plans (WSPs) established under the *Water Management Act 2000* (administered by the Department of Infrastructure, Planning and Natural Resources (DIPNR)) were gazetted for six regulated and seven unregulated MDB catchments in 2002. These plans are implemented as of 1 July 2004. The process for the development of plans for the remaining unregulated catchments in the Basin, and the remainder of NSW, is currently under review by DIPNR.

## Policies, strategies and guidelines

NSW Agriculture has developed best practice guidelines and educational material for agricultural industries that limit impacts on waterways. Such material includes guidelines on vegetable growing, water use efficiencies and managing waterways and wetlands. Currently research is being carried out on preventing phosphorus runoff, and on improved understanding of pesticides and other chemical behaviour in waterways.

The following national guidelines have been developed and distributed to local councils and government agencies in NSW:

- Fairfull S. & Witheridge G. (2003) *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*.
- NSW Fisheries 1998. *Policy and Guidelines: Aquatic Habitat Management and Fish Conservation*. (Eds A.K. Smith and D.A. Pollard), NSW Fisheries, Sydney, 76pp.
- NSW Fisheries 1999. *Policy and Guidelines for Bridges, Roads, Causeways, Culverts and Similar Structures*. (Eds S. Fairfull and S. Carter), NSW Fisheries, Sydney, 19pp.
- Four Regional Sustainable Aquaculture Strategies are currently being developed for the Murray-Darling Basin (Far West, New England, North West and Murray Riverina). Drafts for the Murray Riverina will be available for public consultation shortly.
- A Draft Fishery Management Strategy (FMS) and associated Environmental Impact Statement for stocking of native and alien species has been developed for NSW. Public consultation has taken place and the final document is awaiting ministerial sign-off.

## Other initiatives

The NSW DEC is targeting wetlands in all parts of NSW to ensure the protection of a representative sample of these ecosystems within reserves. For example, in the past few years wetlands have been purchased in the lower Lachlan River floodplain in the western Riverina bioregion; Peery and Poloko lakes in the Lower Paroo River; middle Darling River floodplain (at Paroo Darling National Park and Gundabooka National Park); Macquarie Marshes, Narran Lake, and upper Culgoa River in the west; and Mother of Ducks Lagoon on the Northern Tablelands.

The Convention on Wetlands of International Importance, known as the Ramsar Convention, has criteria covering fish habitat and fish nurseries for declarations of wetlands under the Convention. The NSW Ramsar Strategy is being revised and the NSW DEC will be seeking DPI (Fisheries) input in developing a priority for listing of Ramsar sites under these criteria.

NSW Fisheries have undertaken the following activities that will assist with raising public awareness about threatened species and their habitats:

- Distributed trout cod compliance signs in the Murray, Murrumbidgee and Macquarie catchments.
- Fishcare Volunteer Program — This program is the flagship education initiative of the Recreational Fishing Trusts. The program started in 1999 and now involves over 350 volunteers in 29 regions across the State.
- Mobile education units — these units are used to inform and educate the community about responsible fishing through the use of colourful, practical education units at events, shows and schools.
- NSW recreational freshwater fishing guide 2003/04 (which includes information in relation to threatened species).

The NSW DEC, through its regulation of industries, has continually sought to reduce the impact of discharges on waterways. At several Basin sites, DEC has worked with councils to seek alternative disposal and reuse options for sewage, such as at Gunnedah, Narrabri, Manilla, Dubbo, Albury, Deniliquin and Corowa. At other places, councils and other industrial premises are improving the quality of discharges.



Table 1: Research undertaken during 2003–2004

Investigator	Title	Funding body	Output Status
CRCFE/NSW DPI	Fish Habitat protection in the Barwon-Darling and Paroo Rivers.	NHT 1	Draft report is in preparation
NSW DPI	Integrated fish Monitoring Program.	Lower Murray-Darling CMA (NHT 2) Murrumbidgee CMA(NHT 2) NSW DPI	Sampling complete. Data analysis is underway at present.
NSW DPI	River Murray Fishway Assessments.	MDBC NSW DPI	Annual reports available for 2003
NSW DPI	Innovative fishways development.	NSW DPI NHT 1 MDBC Environmental Trust State Water	A fishway has been constructed at Balranald Weir and funding has been secured to automate the fishway. A report has been produced entitled 'Fish passage through a Deelder lock on the Murrumbidgee River, Australia' by Baumgartner (2003)
NSW DPI	Initial study on methods for carp control.	NSW Water Management Fund CRCFE NSW DPI	Draft report in preparation
NSW DPI	The distribution, abundance and management of threatened fish in the Murrumbidgee River catchment, with special reference to the endangered trout cod.	CRCFE NSW DPI	Data analysis is underway. Findings will be integrated with results from current Environment ACT project (FRDC funded).
NSW DPI	Assessments of the threatened southern purple-spotted gudgeon for recovery planning in NSW.	NSW DPI Macquarie University	Honours thesis by Leanne Faulks in preparation.
NSW DPI	Population biology of Macquarie perch in the Lachlan River.	NSW DPI Macquarie University	Honours thesis by Katie Newton in preparation.
NSW DPI	Assessments of recently constructed fishways in NSW.	NSW DPI State Water	Sampling currently underway.
NSW DPI	Euston Weir (PIT Tags) project – Use of electronic tagging technology to monitor the movement of fish through a recently constructed denil fishway.	RFFTEC	Ongoing assessment as part of the innovative fishways project.



Table 1: Research undertaken during 2003–2004 (continued)

Investigator	Title	Funding body	Output Status
The University of New England (UNE)	Currently undertaking a project which aims to use a combination of laboratory and field trials to establish the hydraulic behaviour of water flow over different bed types in a modular fishway	UNE RFFTEC	Sites are being investigated in the Gwydir and Macintyre river to initiate field assessments
NSW DPI	This study looked at the impacts of structures on the downstream movement of eggs, larvae and young fish and the impacts caused by barriers	NSW DPI MDBC	Two reports completed: Gilligan, D. and Schiller, C. (2003) Downstream transport of the eggs, larvae and juvenile fish in the Murray River. Paper presented at the 'Downstream Migration Workshop', 3–4 June 2003. Canberra, ACT. Gilligan, D. & Schiller, C. (2003) Downstream migration of larval and juvenile fish in the Murray River. NSW Fisheries Final report series No. 50.
NSW DPI & MDBC	Assessment of wild carp populations required for successful implementation and monitoring of daughterless carp gene technology	MDBC NSW DPI	Sampling currently underway.
NSW DPI	Range and status of southern pygmy perch in the Lachlan catchment	NSW DPI	Draft report in preparation
NSW DPI (Fisheries)	Assessment of predictive modelling for river flows and fish	DIPNR NSW DPI	Draft report in preparation
DIPNR	IMEF Hypothesis 2 Fish and stratification	DIPNR	Placing electronic tags in selected fish species will be undertaken in 2004
DIPNR	IMEF Hypothesis 8 Fish and flows	DIPNR	Modelled flow data has been updated and analysis is currently underway
DIPNR NSW DPI (Fisheries)	Integrated Monitoring of Environmental Flows (IMEF)	Treasury Enhancement	12 hypotheses to continue and a backlog of samples to be processed. Several new projects have also been proposed including one which aims to use environmental contingency flows held by irrigation dams to assist in fish recruitment



Table 1: Research undertaken during 2003–2004 (continued)

Investigator	Title	Funding body	Output Status
DIPNR NSW DPI (Fisheries)	Aquatic bioregional classification of NSW	DIPNR NSW DPI	Preliminary classification based upon predicted fish distributions will take place in 2004/2005
DIPNR	Low flows project	DIPNR	Sampling of fish and other biotic groups has been completed. Analysis of fish and flow relationships will take place when flow data has been obtained.
NSW DPI	Spatial and temporal variation of riverine fish communities.	NSW DPI Water Management Fund	Report complete – Gowns, I., Astles, K. & Gehrke, P. (2003) Spatial and temporal variation in the composition of riverine fish communities.

