

INLAND RIVERS NETWORK



News

A Quarterly Newsletter of the Inland Rivers Network

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OF WEIRS AND WATER BILLS, WAMPs AND WETLANDS

This issue of *IRN NEWS* has been produced to coincide with *The Way Forward on Weirs Conference* on 18 and 19 August, Sydney. The Conference, hosted by the Inland Rivers Network, will provide a unique opportunity for those interested in weir management in southeastern Australia to hear from experts from a wide range of fields. With over 4,000 weirs in the Murray-Darling Basin, a great many of which are superfluous and environmentally damaging, the Conference comes at a time when recognition of the need to re-appraise weir management is widespread. Abstracts from some of the presentations are published in this issue, and the conference proceedings are available for purchase as a CD or book.

On the legislation front, both the *New South Wales and Queensland water Bills* were tabled in their respective Parliaments on 22 June, and are out for public comment until late and mid August respectively. There are many inadequacies in both Bills, as detailed later in this issue.

In NSW the Bill's principles for the protection of riverine environments are poorly spelt out, there appears to be no thought given to the ecological effects of water trading, it is overly discretionary on the part of the Minister, and is so vague that many of the key details are to be reserved for the regulations (which are to experience minimal public

comment and are yet to be produced). Loose wording introduces lots of 'wiggle room' for Ministers and Departmental staff whilst public participation is restricted in key areas. Significantly there are few criteria specified for water management plans to guide river management committees and no requirement for independent scientific assessment or auditing of implementation plans.

Whilst there are some very commendable aspects to the Bill many conservationists consider it little real improvement over the *Water Act* of 1912.

The Queensland Government appears set to cement in legislation the demise of the Narran Lakes and the lower Culgoa floodplains in northern NSW. The *Condamine-Balonne Water Allocation and Management Plan* is an unacceptable assault on the natural environment. Of the three options offered by the Queensland Cabinet for consultation, even Option C, the most environmentally friendly, would only wind extractions back to about 1997 levels of development. The Department of Natural Resource's modelling shows that at this level the time that the Lakes remain full would be only 55% of natural. Significantly the predicted frequency of filling required to trigger a waterbird breeding event would be only about 35% of natural. IRN asks exactly what does recognition of a wetland by the international community mean, under the Ramsar Convention, if that is all the protection that it affords? DNR must consult widely with conservation interests over options to reduce environmental impacts on downstream wetlands and floodplains.

**NSW Water Management Bill and Queensland Water Bill · Sustainable Rivers Audit
The Way Forward on Weirs Conference abstracts · Murray Hardyhead Endangered in NSW
Condamine Balonne WAMP · Southwest Queensland WMP · Cold-water Pollution Mitigation
Indigenous Significance of Barwon River Wetlands · IPART Review of Bulk Water Prices
Entire Victorian Fish Community Listed as Vulnerable · Pulling Down Wellington Dam
Pesticide and Nutrient Report from Cotton Country · EPBC Act and the Murray-Darling Basin
Bringing Back the Fish in the 'Bidgee · Gwydir Floodplain Development**

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Historically poor water legislation and an unwillingness by the Department of Natural Resources to curb the rapid expansion of cotton in the lower Balonne has seen flows south of the border plummet in the last decade. Huge developments such as Cubby Station have appalling impacts on rivers and wetlands downstream. Much of this development has happened in only the past few years when rivers throughout the rest of the Basin have been implementing the Cap. The noteworthy exception is the absence of a cap on diversions in the **Barwon-Darling Rivers**, which has made concerns voiced by the NSW Department of Land and Water Conservation over excessive Queensland irrigation development sound rather hollow.

The Murray-Darling Basin **Salinity Management Strategy** is likely to be released in early September if approved by the MDB Ministerial Council on August 25. The NSW **Salinity Strategy** is due for release on 16 August when the NSW Cabinet meets in Wellington. The success of the former strategy Basin-wide is substantially contingent upon the adequacy of the latter. If the NSW strategy is overly reliant upon market-based incentives and fails to provide sufficient funding and a regulatory capacity for reducing the level of unsustainable catchment use it will be a golden opportunity missed and one that we may not have again.

The entire **fish community of the lowland Victorian** section of the Murray-Darling Basin has been recommended to be listed as a vulnerable ecological community. It is the first listing of an entire fish community in the Basin and is likely to set a strong precedent. The recommendation was made by the Victorian Scientific Advisory Committee established under the *Flora and Fauna Guarantee Act 1988*. The geographical range covered includes the lowland reaches

and floodplains of tributaries of the Murray River such as the Mitta Mitta, Ovens and Avoca, and the Murray itself. Fish species included in the community are the once common Murray cod, silver perch and catfish.

North of the Murray another fish has been recommended for listing as a threatened species. The NSW Fisheries Scientific Committee has recommended that **Murray hardyhead be listed as an endangered species**. The fish grows to 7 cm long and was once very common in the Murray. It is probably extinct in NSW and is endangered in Victoria.

A report by IRN's **Inland Wetlands Education Officer** on the importance of wetlands to the economy and culture of indigenous Australians in the Barwon region will be released in the near future. A summary of the report is provided in this issue.

The Cooperative Research Centre for Freshwater Ecology has released its scoping report for the proposed **Sustainable Rivers Audit**. The SRA proposes annual Basin-wide reporting on invertebrates and fish communities plus water quality, with five yearly comprehensive assessments of a range of ecological indicators. Together with the proposed MDB *Integrated Catchment Management* and Salinity Management Strategy, the SRA will be considered by the MDB Ministerial Council on 25 August.

A seminal report on the technical options for **mitigating cold water pollution** has concluded that the expected costs of addressing this major pollution problem are significantly lower than previously thought. With solutions costing in the range of as little as hundreds of thousands to several millions of dollars, rather than the multi tens of millions of dollars

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once thought, it is now up to State Water and NSW Fisheries to seek the required funds from the NSW Treasury.

Finally the Federal *Environment Protection and Biodiversity Conservation Act 1999* is now in force. With the potential to allow greater Commonwealth scrutiny in developments which affect inland rivers, it remains to be seen whether in fact the Federal-State bilateral agreements on environmental assessments will afford greater environmental protection.

I hope you enjoy the August 2000 issue of *IRN NEWS!*

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SCOPE OF THE SUSTAINABLE RIVERS AUDIT

A report to the Murray-Darling Basin Commission by the Cooperative Research Centre for Freshwater Ecology, June 2000.

This scoping paper provides a basis for discussion on a means for auditing the health of rivers in the Murray-Darling Basin. The study will be considered by the MDB Ministerial Council at its meeting on 25 August. The following summarises the CRC for Freshwater Ecology's report.

The Sustainable Rivers Audit (SRA) is proposed to provide a comparable means of reporting river health across the Murray-Darling Basin as the basis for an informed discussion on this matter. It is our view that such an audit is quite feasible and would fill a major feedback gap in the existing management of the Basin. With water becoming an increasingly scarce and valuable resource, people seek assurance that water allocated to the environment is delivering real environmental benefits. The SRA can be designed as a comprehensive annual review of the condition of waterways to inform debate amongst the Basin community.

All jurisdictions are already collecting considerable data to help them with management of water resources. Some additional effort will be required to make the sampling effort more comprehensive, and further effort will be needed to develop reporting approaches that allow an assessment of the ecological outcomes resulting from land and water management in each jurisdiction. As part of the Audit process we envisage States collecting and reporting data on an annual basis as the SRA. This data would provide the foundation for an annual dialogue between the State and the Independent Sustainable Rivers Audit Group (ISRAG). The dialogue would cover the reported indicators, the conditions affecting the indicators, and what actions the States have taken in its management of land and water and how these are expected to alter the indicators.

We envisage a more comprehensive process at the beginning, and thereafter every five years, where additional data on biological outcomes and the habitat is presented,

along with a compilation of the annual data and an attempt to identify trends. We have termed this the Comprehensive Sustainability Assessment (CSA).

Principles

Some principles have emerged in this scoping process that should be explicit.

- The Audit process must have clear and explicit objectives.
- The Audit process should be a comprehensive assessment of the health or condition of the rivers of the Basin including regulated and unregulated rivers and is not simply an assessment of the Cap and the environmental flow allocations being put in place by the States.
- It must not be excessively demanding on data and should build on what is being collected already in State and National programs.
- It must provide clear information to the Basin community about the health of the rivers.
- It must provide a basis for an annual dialogue about the health of the rivers, on a river valley basis, where the condition of the rivers and the water management actions in place or proposed are discussed.
- It must emphasise ecological outcomes rather than just factors like flow and water quality which determine those outcomes. These are not effective surrogate measures of river health, although they are important drivers of river health.
- We do not have a simple measure of river health any more than we have a simple scale of human health. However, there are a range of indicators which, if taken together, allow judgements of overall health or condition to be made.

We make the following specific recommendations to guide this Audit Process.

Objectives

The Sustainable Rivers Audit is to be a comprehensive assessment of river health across all the major river valleys of the Basin, rather than just an assessment of the impact of the Cap or environmental allocations. It is to provide an annual report that allows a dialogue on the condition and the factors affecting it. It is further informed by a Comprehensive Sustainability Assessment (CSA) undertaken at the start of this process and thereafter every five years.

Framework

States are to collect and present data on the agreed indicators in an agreed format. The MDBC, and if required the CRC for Freshwater Ecology, will work with the States to reach agreement on these issues. The Audit document is to form the basis for the annual dialogue with an Independent

Sustainable Rivers Audit Group, the findings of which are to publicly available to the Basin community.

Indicators

The Annual Audit needs to report on measures of biota, which reflect ecological outcomes, and measures of flow regime and water quality, which represent important drivers of the biological outcomes. The five yearly CSA will report as well on measures of habitat and will include more comprehensive information on biological outcomes.

1 Biological Indicators

The biotic measures of the SRA should be based in the first instance on aquatic invertebrates and fish communities. Other biological measures should be reported in the five yearly CSA. These might include information on algal growth, algal blooms, riparian vegetation, aquatic plants, aquatic and riparian weeds, wetland area and condition and water birds.

2 Hydrological Indicators

There is extensive hydrological data and modelling already available and used in assessing the compliance with the Cap. These can be reported annually as part of the SRA and would require no additional data collection.

3 Water Quality Indicators

There is extensive information on water quality already being collected throughout the Basin. We propose a water quality

index incorporating four elements - Total Phosphorus, electrical conductivity (salinity), turbidity and pH be developed and reported annually.

4 Habitat Structure Index

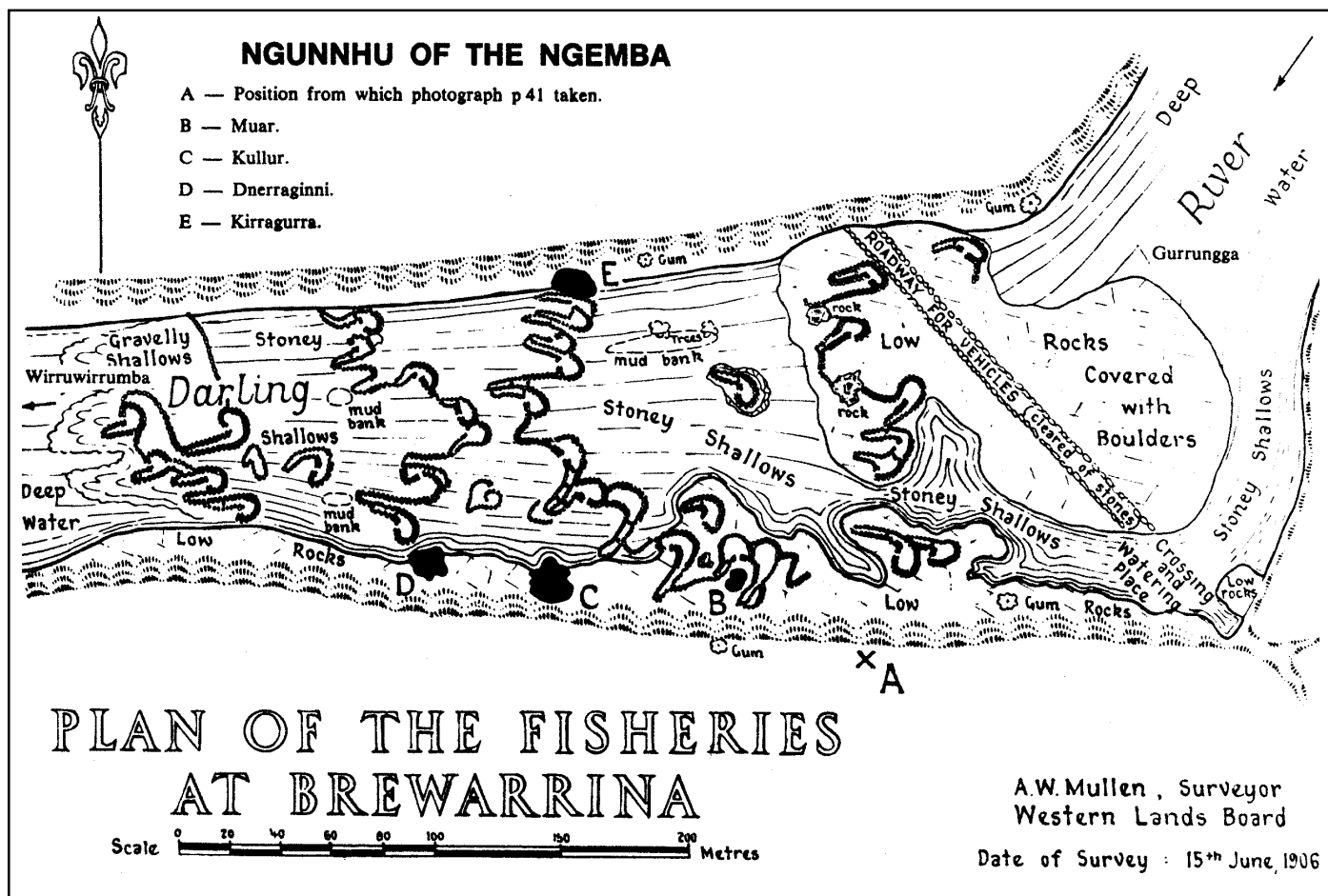
Habitat, along with flow and water quality, is the other major determinant of biological outcomes. It is a complex area, and we propose developing an index with five elements reflecting connectivity (weirs and levees blocking water movement), riparian condition, woody debris in stream, geomorphic and wetland elements. The habitat index is to be reported five yearly as part of the CSA.

The scoping study can be obtained from the CRC for Freshwater Ecology. Ph 02 6201 5168, pa@lake.canberra.edu.au or at http://freshwater.canberra.edu.au

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TRADITIONAL ABORIGINAL USES OF THE BARWON RIVER WETLANDS

This report was compiled by the Inland Rivers Network Wetlands Officer to give an overview of the traditional Aboriginal uses of wetlands of the Barwon River, and the values these wetlands hold for Aboriginal people. Although



The Ngunnhu as they were in 1906. From Dargin, Aboriginal Fisheries of the Darling-Barwon Rivers, Development and Advisory Publications of NSW, Dubbo 1976.

PESTICIDE AND WATER QUALITY MONITORING REPORTS FOR THE CENTRAL AND NORTH WEST REGIONS, 1998-99

a number of Aboriginal people were consulted, it is primarily a white person's interpretation of their history and culture.

The area considered is that adjacent to the lower Barwon River, from Mungindi on the Queensland/NSW border to Brewarrina, including the Narran River and Narran Lakes. Using the Ramsar definition of wetlands (Convention on Wetlands of International Importance at Ramsar, Iran in 1971), the Barwon and Narran Rivers, their smaller tributaries, ephemeral lakes such as Narran Lake, and all associated floodplain can all be considered wetlands.

Aboriginal people from six nations originally occupied the area of the Barwon River wetlands. These were the Ngemba, Baranbinja, Murrawari, Ualayai, Weilwan, and Kamilaroi. These peoples' traditional uses of wetlands can be broadly divided into two categories: hunting, fishing and gathering uses and cultural association.

The value of hunting, fishing and gathering to Aboriginal people goes far beyond just sustenance. It is fundamental to their traditional and contemporary culture, helps define their identity, and plays an essential role in the education.

Aboriginal people's long and powerful cultural association with the Barwon River wetlands can be seen by the presence of several important Bora grounds (ceremonial areas), as well as many burial sites, and post-occupation sites such as the Brewarrina mission. Additionally, the Ngunnhu fish traps at Brewarrina and the Ramsar-listed Narran Lakes remain two of eastern Australia's most important Aboriginal cultural sites (see Figure opposite).

Since European settlement, the ability of Aboriginal people to practice traditional activities in the Barwon River wetlands has been severely compromised. The general environmental health of the region has also suffered during this time, resulting in widespread extinction of native species, degradation of soil and water quality, and the introduction of exotic species.

There are a number of steps that must be taken to overcome the marginalisation of Aboriginal people in the natural resource management of this region. Perhaps the most important step is the recognition of Aboriginal peoples' traditional rights to access clean and healthy water and traditional foods which require clean, healthy rivers, with sufficient water to function as an ecosystem. The recognition and restoration of these rights is not only in the interest of Aboriginal people, but will help conserve the biological diversity and restore the natural functioning of the Barwon River wetlands.

A full copy of this report will be available from the IRN website from late August.

For more information contact IRN's Inland Wetlands Education Officer Craig Woodfield on 02 9241 6267 or email iweo@irnnsw.org.au

The Department of Land and Water Conservation's 1998-99 Central and North West Regions Water Quality Program reports on Pesticides and on Nutrients and General Water Quality conditions at sites in the Macquarie, Namoi, Gwydir, Darling and Border Rivers. The following is a summary of key aspects of the two reports.

Pesticides

During the summer cotton season 53% of water samples contained residues of endosulfan, the most commonly used insecticide for cotton pests, at levels exceeding the draft ANZECC* and ARMCANZ guidelines for environmental protection. This represents a decline over previous years (e.g. 63% in 1997/98), but was due to low runoff due to dry weather and degradation due to hot weather. No pesticide levels exceeded human drinking water health guidelines.

Detections were lower in the Namoi in previous years. (*Note that the National Registration Authority has tightened regulations on endosulfan use over the 1999-2000 growing season.*)

Eight percent of samples contained levels of the herbicide atrazine exceeding environmental guidelines. Other commonly detected herbicides were diuron, fluometuron, metolachlor, prometryn and simazine.

The first stages of an ecological risk assessment in relation to pesticides in riverine systems indicated that endosulfan, profenofos, chlorpyrifos and diuron had a high environmental risk.

Chemical contamination was detected across most areas of each catchment where agriculture was intensive, though the lower sites of each basin generally had the highest detection rates. Of the 18 sites where sediments were monitored for pesticides, ten had positive detections with endosulfan sulfate (the main breakdown product of endosulfan) the most commonly detected.

Endosulfan was mainly detected in water samples from early November to mid December 1998, but endosulfan sulfate, which binds to sediments and organic matter for longer periods, was detected through till early March 1999. These seasonal patterns have occurred since monitoring began in 1991.

Median endosulfan levels greatly exceeded the draft trigger level in several valleys: 0.04 ug/l in the Gwydir, 0.025 ug/l in the Border Rivers and 0.02 ug/l at Bourke. Note that the trigger level is 0.001 ug/l, but the analytical detection limit is higher at 0.01 ug/l.

(*IRN notes that endosulfan is the only organochlorine insecticide still being used in Australia and has been banned in the United States. IRN considers that it should be banned in Australia as well. In addition chlorpyrifos,*

(Continued on page 8)

THE WAY FORWARD ON WEIRS

The Way Forward on Weirs Conference on 18 and 19 August 2000 will present talks from 30 selected speakers on key issues regarding the management of weirs in southeastern Australia. Selected abstracts are presented below.

A RIVER TRANSFORMED—THE EFFECTS OF WEIRS ON THE RIVER MURRAY

Associate Professor Keith Walker, CRC for Freshwater Ecology, University of Adelaide

The 830 km River Murray below the Darling junction is impounded by 10 weirs built originally (1922-37) to aid navigation but now operated mainly as pools for irrigation. The weirs are 3 m high, with pools 29-88 km long. Flow regulation generally has reduced the natural winter-spring peak and decreased the variability of mid-range flows, and discharge at the Murray mouth now is about 21% of the natural average. The weirs maintain steady pools except during over-bank flows. The fluctuations affect littoral plants and animals. The weirs may promote development of algal blooms by impeding flow. Their hydraulic effects also contribute significant amounts of salt to the river. Channel changes in response to weir construction are continuing, and the river is progressively developing a stepped gradient through deposition upstream of each weir and erosion downstream.

Regulation has increased the numbers of permanent wetlands but decreased those subject to occasional drying, and those affected may no longer produce the characteristic pulse of organisms associated with re-flooding. The vigour and regenerative capacity of the floodplain vegetation also are flood-related. In the river channel, water-level changes may have promoted the growth of algae at the expense of bacteria, and reduced the nutritional value of biofilms for grazing animals, notably snails. Although about 18 snail species were present before weir construction only two remain in significant numbers. The banks of the un-regulated river typically were bare, but the pool margins have been invaded by emergent plants and introduced willows, and the distributions of crayfish, freshwater mussels and other animals also have changed. One native fish that probably has benefitted from impoundment is the bony herring which, like the introduced carp thrives in the pools.

ALTERING WEIR STRUCTURES AND WEIR OPERATIONS TO BE MORE ENVIRONMENTALLY FRIENDLY

Dr John Harris, CRC for Freshwater Ecology, Sydney

Australian water managers find themselves in a worsening dilemma. Weirs and related structures are an integral part of our settlement and use of the land, but their impacts are increasingly recognised as environmentally damaging. Given that we will continue to need many of the thousands of existing weirs, what can practically be done to minimise their damaging effects?

Options exist for altering weir structures or weir operations to improve management of downstream habitats, weir-pool habitats, pest species, fish passage, water quality, nutrients

and algae and recreational assets. These alterations need not destroy the original purpose of the weir. Most would work best if combined with other measures. At fixed-crest weirs, for example, combinations of stepped notching to provide pool levels and downstream flows that fluctuate with different river discharges, low-cost fishways, structural habitat rehabilitation

(e.g. re-snagging and downstream bank stabilisation), together with staged water-extraction rules and flow-release strategies to limit blue-green algae, could provide far greater environmental benefits than would occur from any of these alterations alone. We need also to evaluate options for the concerted management of a string of weirs in a system, for example in salinity control or fish passage, to maximise the benefits for minimal cost.

Except for fish passage, the process of assessing environmental benefits from weir modification is in its infancy. A number of fishways have been assessed successfully. Fish migrations have been assisted by altering the routine of navigation locks. Large-scale fish movement over weirs drowned out by new water-extraction rules has been documented. Improvements in biodiversity and water quality have been shown after changing pipe culverts to the box design.

Strong community support is needed to realise these potential benefits from weir alterations. The knowledge base needs further development and a strong ongoing commitment to

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THE WAY FORWARD ON WEIRS

research is the key. Local community involvement and support will be needed also for practical trials to apply the research, to test the ideas. The challenge is to ensure that new generations of Australians grow up believing that healthy rivers are their natural heritage.

THE REMOVAL OPTION – A CASE STUDY OF BOMADERRY CREEK WEIR

Allan Lugg, NSW Fisheries, Nowra

Bomaderry Creek weir was a 3m high disused water supply weir on a tributary of the Shoalhaven River. A local recreational fishing groups asked that it be removed to allow Bass to return to the upper creek. Whilst seemingly straightforward, removal entailed overcoming a host of issues and opposition including recreational use of the weir pool, threatened species (bat) management, heritage considerations, restoration and sediment and weed control.

Indeed opposition came from those organisations whom you would expect to be supportive. As a final compromise a 3 metre section of the wall was removed thereby satisfying both heritage and fish passage objectives.

A CITIZEN'S GUIDE TO RESTORING RIVERS THROUGH SELECTIVE REMOVAL OF SMALL DAMS

Stephanie Lindloff, River Alliance of Wisconsin, USA

There are tens of thousands of small dams across the United States that are no longer used for their original purpose, serve no economic function and are badly deteriorated. Selective dam removal is an important river restoration tool that often makes the most sense economically and environmentally. Nonetheless, the vast majority of dam repair/removal decisions end in repair, at great cost to communities and to our rivers.

Meanwhile, public dialogue about dams and dam removal has dramatically increased nationwide. In an effort to meet this growing need for information the Small Dams Program has developed the Citizen's Guide to Restoring Rivers Through Selective Removal of Small Dams. Based on extensive firsthand experience this guide provides citizens, local officials and others with the information they need to increase consideration of dam removal at the local level.

Contents include: how to research a dam of concern; issues that need to be considered during the dam repair/removal decision; tools to use when pursuing a dam removal; developing a strategy and identifying tactics for increasing consideration of dam removal locally; planning and carrying out river restoration work; worksheets to use throughout the process and more.

Dam removal is not appropriate in all situations, but for many rivers dam removal is the single most important thing we can do to restore the health of the waterway. Today we know that a healthy river is not just the heart of a healthy ecosystem, it is also the heart of a healthy community.

ENGINEERING SOLUTIONS FOR ALTERNATIVE WATER SUPPLY FOR SMALL TOWNS

Tahmina Smyth, PPK Environment & Infrastructure, Sydney

In NSW over 4000 weirs and dams have been installed in rivers for various purposes including irrigation, transport, recreation and/or water storage. A proportion of these structures provides security of water supply to communities along the river whereby water is extracted from the weir pool and fed to households following some form of treatment. PPK was

commissioned by the World Wide Fund for Nature to investigate five sites in central western NSW, with a view to demonstrating that alternative water supply solutions exist that enable the affects of barriers to be significantly reduced or removed entirely.

The five sites selected that currently use river water from weirs as their primary source of town drinking water, were Louth, Tilpa, Pooncarie, Yeoval, and Glen Innes.

A range of possible alternative water supply options are discussed in this paper, including modification to the existing weir structures, groundwater as an alternative source, in stream storage of river water, off-stream storage of river water, increased rain water storage, all combined with demand management strategies. The engineering and non-engineering factors influencing choice are discussed, including site specific environmental, hydrogeological, economic and social considerations.

Four key themes will be addressed by 30 presenters at the Conference

- What are the effects of weirs on the environment?
- How can weir operations be altered to reduce environmental impacts?
- How can weirs be removed or modified?
- Thinking laterally about water supply and management.

which has been detected at a similar rate of exceedance over the past 5 years levels above environmental guidelines, has also recently been banned in the United States).

Nutrients and General Water Quality

No samples exceeded ANZECC guidelines for raw water and aquatic ecosystem protection. However median total nitrogen and phosphorus levels for all sites fell within or above the previous 1992 ANZECC indicative range at which algal blooms are known to occur. Median total nitrogen levels exceeded the 750 ug/l upper threshold for algal bloom formation throughout the entire Macquarie River catchment. High levels were also detected below sewerage treatment plants in the Peel and Namoi Rivers.

Total phosphorus levels were positively correlated with turbidity in general, indicating that the most important source of phosphorus in these rivers is eroded soil.

*ANZECC is the Australian and New Zealand Environment and Conservation Council. ARMCANZ is the Agriculture and Resource Management Council of Australian and New Zealand.

Reports can be obtained from Monika Muschal, Department of Land and Water Conservation, Newcastle, Ph 02 4960 5037.

Stuart Blanch, Coordinator, Inland Rivers Network, Ph 02 9241 6267.

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QUEENSLAND'S CONDOMINE-BALONNE DRAFT WATER ALLOCATION AND MANAGEMENT PLAN.

This has become one of the most controversial of the Water Allocation and Management Plans to date, due to proposed claw-backs from irrigators and the Plans impact on the Ramsar listed Narran Lakes.

The Queensland Government has also chosen to ignore the expert panel it set up to advise it. Added to this are tensions that may arise with the Commonwealth and other States, due to the downstream impacts and the Plan's non-compliance

with COAG Water Policy and Murray-Darling Basin Agreements.

Environmental consequences

- None of the three 'Options' proposed in the Plan meet the environmental flow limits recommended by the scientific panel. This means that all three will probably result in unacceptable environmental degradation, with the Queensland Government intending to permit significant environmental damage.
- WAMP Options A & B mean frequency of floods in Narran Lakes needed for ibis and egrets to breed will lengthen from 1 in 5 years to around 1 in 14 years. The birds only live about 8 years.

- Levels of extraction have likely resulted in the reduction of as many as 100,000 breeding pairs of birds at Narran Lakes in the last ten years.

- The Plan canvasses diverting flows from other tributaries toward Narran lakes, which would starve these other rivers of water, impacting on users in NSW and other on significant wetlands.

WAMP in conflict with national agreements

Catchments in other States have implement the MDB Cap at 1993/94 levels of development. Since 1993/94 extraction levels have dramatically escalated in the Condamine-Balonne:

- 1997 to 1999 saw a 25% increase in water

diversions;

- Off river storages climbed from 290 GJ in 1993-94 to 942 GJ in mid 1999, an increase of corresponding to 1.3 times the volume of Sydney Harbour; and,
- Metered diversions rose from 385 GJ in 1993-94 to 647 GJ in 1999.

The WAMP is supposed to be the means by which Queensland addresses the Cap. The fact that the WAMP is over two and a half years overdue, combined with the level of extraction that has recently occurred, makes it highly questionable as to whether the WAMP is sufficient. Beyond

the environmental impacts that have arisen, it also raises serious questions about the equity of Queensland's actions for downstream NSW landholders.

The WAMP is also significantly in conflict with the COAG Water Resource Policy agreed to in 1994:

- The plan is not based on the best scientific information available. Whilst the information has been gathered the Plan's options are in conflict with the scientific advice.
- The Plan has a 10 year life, not the recommended five year period and that proposed for River Management Plans in NSW. This means the consequences of wrong allocation decisions will have an effect for much longer.

Submissions and action

The consultation period closes on 15 September. The Beattie Government has come under sustained pressure from rural lobby groups and businesses – even setting up special committees to “give irrigators a stronger voice”. Such actions do not bode well for the Government's final decision.

To even get the Government to choose the least environmentally destructive option in the WAMP, it is essential that letters are sent to Premier Beattie, Environment Minister Rod Welford and newspapers. The key issues the Queensland Government needs to address are:

- Meeting the environmental flows recommended by the Technical Advisory Panel.
- Making sure that the WAMP complies with the Government's own Water Bill regarding protection of biodiversity and natural ecosystems, as well as intergenerational equity.
- Providing for sufficient flows to ensure that the Ramsar values of Narran Lakes are protected.

The Commonwealth and other States need to ensure that Queensland fulfills its commitments relating to the COAG Water Reform Policy and the MDB Cap.

Submissions must be lodged by 15 September with the Condamine-Balonne WAMP Coordinator, DNR, PO Box 318, Toowoomba, Q 4350.

Sean Hoobin, Queensland Murray-Darling Officer, WWF, Ph 07 3839 4527, email: seanhoobinwwf@hotmail.com

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SOUTH-WEST QUEENSLAND WATER MANAGEMENT PLAN

The draft Water Management Plan (WMP) for the Warrego, Paroo, Bulloo and Nebine catchments was released by the Queensland Government on 22 June, 2000 (it can be viewed at www.dnr.qld.gov.au). The Plan deals with water allocation for some of the most pristine rivers in the Murray-Darling Basin. The Paroo is the last major free flowing river in the

Basin and about half of the Basin's remaining wetlands occur in these three sub-catchments.

Land use in the catchments is based upon grazing, with only relatively small areas along the Warrego River used for irrigated cropping. Many landholders, particularly in the lower ends of the catchments, currently rely on natural river flows and beneficial flooding. However, there is some pressure for further irrigation, mainly from landholders higher up the catchment. Further extraction would risk damaging both the ecological and economic values of these largely unregulated rivers.

The Plan does allow for increased water use in each of the four catchments for “industrial” use. Only the Bulloo is to be opened up for greater irrigated cropping. The impact of this extraction on the Bulloo, currently with only 0.007% of mean annual flows diverted, is one of the key concerns. The assessment and control of impacts arising from the industrial uses, as well as the lack of scientific information and ongoing ecological monitoring, are other key flaws in the document.

Key WMP Facts

- The Warrego, Paroo and Nebine catchments are in the north-west of the Murray-Darling Basin, spanning Queensland and NSW. The Bulloo, just to the west, is a self-contained system.
- The Paroo is the last major free-flowing river in the Murray-Darling Basin.
- The Plan provides for 100 MI p.a. in each catchment to be used for “small scale industrial use”.
- The Paroo and Warrego have no further allocations (although the Warrego is the most extracted catchment with 31 200 MI p.a. diverted).
- The Plan allows for 510 MI p.a. to be harvested for irrigated crops in the Bulloo.
- The Nebine has an overall reduction in water extraction, however the increase in some sub-catchments may impact on wetlands.
- Comments close on 11 August 2000 and should be addressed to South West WMP Project Officer, Department of Natural Resources, PO Box 224 CHARLEVILLE Q 4470. The below key issues need to be brought strongly to the attention of the Queensland Government.

Key WMP issues

- The document is based on grossly inadequate information. This means that the impacts of current extraction levels are not known, let alone the consequences of further extraction.
- The lack of scientific information led the Government to not allow any further extraction for irrigation in the Warrego and Paroo. But with the same absence of information, increases in allocation of 1200% in the Bulloo is proposed – a reckless act.

- The 100 MI allocated to each catchment for “industrial use” includes aquaculture and feedlots, which have the potential to significantly impact on aquatic ecosystems. How proposals will be assessed and developments properly controlled is not dealt with.
- The WMP is inconsistent with the Queensland Government’s own Water Bill, both at a legal and policy level. The WMP’s purpose is inconsistent with the Bill’s and may not even have to fully comply with the Bill’s purpose relating to environment protection, intergenerational equity and consideration of interstate impacts.
- An absence of ecological outcomes relating to water flows, and no proper regime to monitor ecological health and impacts.
- Large amounts of water are being taken out of the system through water diversion, floodplain harvesting and overland flow. The Plan does include this water in its extraction assessments, nor the resulting environmental impacts.
- Water for town, stock, domestic, construction, drilling and exploration has no upper limit.

Sean Hoobin, Queensland Murray-Darling Officer, WWF, Ph 07 3839 4527, seanhoobinwwf@hotmail.com

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THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Opportunities and Implications

On 16 July 2000, the new Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (‘EPBC Act’) commenced. The EPBC Act presents a range of tools and mechanisms for the protection of inland rivers and wetlands.

Under the new legislation, the Commonwealth Minister for Environment and Heritage now has powers over new developments or projects which may have a ‘significant impact’ on a matter of ‘national environment significance’ (NES). These include:

- Listed threatened species and ecological communities;
- Ramsar wetlands;
- Listed migratory species; and,
- World Heritage properties.

Implications of the EPBC Act

The EPBC Act has the potential to encompass a wide range of activities that may have adverse impacts on freshwater ecosystems, including:

- Irrigation and other consumptive use developments;
- Water infrastructure projects (such as weirs, channels, levee banks or dams);
- Developments that may alter flow volume or discharge pollutants into rivers affecting native fish and wetlands; and,
- Land clearing activities.

Key matters of NES which may capture such developments are listed threatened species (including native fish species) and ecological communities, listed migratory species and Ramsar wetlands.

A proposed new development, or an expansion of an existing development, that may have a significant impact on a matter of NES – even in State and Territory areas – will trigger Commonwealth environmental impact assessment processes. Penalties for taking actions without approval under the EPBC Act are potentially severe – up to \$5.5 million or 7 years imprisonment. The offender may also be required to pay for the mitigation or repair of any damage caused by the action.

The EPBC Act applies in addition to State, Territory or Local Government requirements and approvals – except where approval was given for a project before 16 July 2000. Commonwealth, State, Territory and Local Government departments and agencies are also required to comply with the Act. There is also potential for the Commonwealth to enter into bilateral agreements under the Act [see box].

Further Extension of the EPBC Act

The application of the EPBC Act may also be increased over time, for example, with the proposed addition of national heritage sites to the list of matters of NES. Further ‘triggers’ (or matters of NES) could also be added to the EPBC Act in the future – for example, a water allocation ‘trigger’ or a land clearing trigger.

Further information on the EPBC Act, its opportunities and implications is available at:

- Environment Australia EPBC website: <http://environment.gov.au/epbc/>
- World Wide Fund for Nature – Humane Society International EPBC Unit: <http://www.wwf.org.au> from 8 September-until then check www.hsi.org.au/epbc.html
- Environmental Defender’s Offices Network: <http://www.edo.org.au>

‘Significant Impact’

To provide guidance as to when an impact will be considered “significant” under the Act, the Commonwealth Government has released administrative guidelines. These are available on the Environment Australia website:

http://environment.gov.au/epbc/epbc_act/epbc_act.html#guidelines

For example, in the context of Ramsar wetlands, actions likely to

require approval under the Act include:

- Actions that may change the hydrological regime or water quality of the wetland;

- Actions that may seriously affect the habitat or lifecycle of native species dependant upon the wetland; or,
- Actions which may result in harmful invasive species becoming established in the wetland.

Importantly, this includes actions taken outside the boundaries of the wetland, such as in the wetland's catchment.

Online Information

Useful information about the EPBC Act is available on the Environment Australia website at <http://environment.gov.au/epbc/>

This site contains an 'online interview' which goes through the Act step by step to assess whether Federal Government approval may be required for any development proposal. It also has an 'online database' that allows for an 'interactive map search' of the distribution of matters of NES, including nationally threatened species and ecological communities. These tools will assist proponents, conservation groups, and government agencies to determine whether development proposals should be brought to the attention of the Minister for assessment under the EPBC Act.

The website also provides a list of current projects referred under the Act and information about current opportunities to comment on those referrals: http://www.environment.gov.au/cgi-bin/epbc_ap.pl?name=current_referrals

Opportunities

There are a number of options available under the EPBC Act for groups and individuals concerned about proposed developments that may adversely affect the ecological health of inland river systems. If there is any doubt as to whether the proposed development will affect a matter of NES, Environment Australia's online interactive map search can be used to determine whether any matters of NES are likely to be in the development area.

If there is the potential for a significant impact on a matter of NES, it is possible to write to the developer or relevant State agencies requesting them to refer the development to the Commonwealth Minister under the EPBC Act. It would also be advisable to write to the Commonwealth Minister to bring development proposals to his or her attention for

Bilateral Agreements under the EPBC Act

Under the EPBC Act, the Commonwealth may enter into 'bilateral agreements' with State Governments. These agreements provide for the accreditation of State environmental impact assessment processes (an 'assessment bilateral'), or, in limited circumstances, accreditation of State assessment and approval processes (an 'approval bilateral'). If an action is covered by an assessment bilateral, then that action is assessed under the accredited State process, and the Commonwealth can rely on that assessment. The action will still require approval under the EPBC Act from the Commonwealth Environment Minister. Under either bilateral agreement, projects must still be referred to the Commonwealth first. And even where there is a bilateral agreement in place, projects that are not picked up by State environmental laws, such as certain floodplain developments in NSW and Queensland, may still be assessed in full by the Federal Government.

To be accredited under a bilateral agreement, a State process must meet certain minimum benchmarks, which have been set down by the Commonwealth in the EPBC Regulations. At this stage, only assessment bilaterals are being negotiated between the Commonwealth and State Governments, rather than approval bilaterals.

Senator Hill recently published draft assessment bilateral agreements for each State and Territory under the EPBC Act. The draft agreements were published unilaterally, and have not as yet been endorsed by any State or Territory Government. The draft agreements are available at: <http://environment.gov.au/epbc/bilateral/bilateral.html>.

Public comments on the draft bilaterals must be provided to Environment Australia by 18 August. The draft agreements should be carefully examined to determine not only whether the accredited State systems meet the Federal benchmarks, but whether best practice standards for environmental impact assessment are met.

(Continued on page 14)

WATER LEGISLATION REFORM

INITIAL CRITIQUE OF THE NSW WATER MANAGEMENT BILL 2000

The discerning IRN NEWS reader will be aware that the State's water resources and ecosystems are in a desperate state. There is need to reform the way we manage, perceive and value our water and ecosystems, at all levels.

One of the key aspects of the ongoing NSW Governments water reform process, is the re-writing of the NSW Water legislation this year. The NSW *Water Management Bill 2000* was tabled in Parliament on 22nd June, and is currently available for public consultation until the end of August.

NCC have been wading through this doorstopper of a document and asking the question, "*Can the Government effectively create the paradigm shift needed to achieve sustainability of the States water resources through this Bill?*" The answer so far unfortunately indicates that this Bill will not restore, protect and preserve our precious resources.

NCC has been disappointed that none of the main policy recommendations made in our submission to the White Paper have been incorporated into the Bill. Even though the Bill contains high level environmental objectives, which is commendable, NCC at this stage has doubts as to the effectiveness of the evidently ad hoc management framework described. This framework inadequately provides for environmental water that is protected both from the market and from extractive use.

The Bill does not satisfactorily allow for public participation in the management of water resources, it also leaves much of the decision making processes to the discretion of either the Minister or Water Management Committees. There is no indication of how integrated natural resource management will occur, in particular the integration of Catchment Management Boards and Water Management Committees. Further to this, NCC has some serious concerns about the Bill actually meeting COAG requirements.

In brief, NCC believe that the Water Management Bill 2000 does not reflect a will to alter the current scenario, for the following reasons:

- Environmental objects are not reinforced throughout the Act (eg. in water management planning);
- Environmental water principles are not clearly articulated, and not established on a scientific basis;
- There is no mechanism for environmental water to be protected along the full length of a river system;
- The various environmental water classifications are unclear in relation to which categories are capable of being traded;

- Public participation/scrutiny of decisions is not adequately provided for (particularly in relation to implementation plans/programs);
- Environmental considerations are not reflected during implementation phases;
- The hierarchy of objectives and which objectives take priority in the event of litigation is not clear;
- Auditing/monitoring of water management, planning, and administrative processes are not provided for;
- Lack of compliance mechanisms in relation to water management, planning, and administrative processes;
- Failure to require water efficiency mechanisms, particularly in relation to Town Water Supply (eg. Demand management strategies); and,
- Native Title rights are not adequately recognised.

The aim of NCC involvement in commenting upon the Bill is to ensure the creation of a management and planning framework that will protect and restore the environmental values of NSW water ecosystems, in a manner that encourages public participation and scrutiny at every stage of implementation. We want to foster the use of tools which will guide the quest for sustainability including demand management and water efficiency incentives.

Initial consultation with Government indicates to us that they realise the extent to which the Bill fails to meet NCC's objectives. It is our hope that we may be able to work constructively with Government during the consultation phase in order to rectify some of the failings highlighted above. At this stage we have faith that this process will prove to be beneficial in strengthening the framework for management in the Bill and create legislation that will achieve real environmental outcomes that can be measured on the ground.

The proof of the success of the next few months' hard work will be seen once the Bill is debated in Parliament later this year. We will be able to tailor our campaigning to the level of success we have achieved through the consultation phase at this time. Due to the broad range of concerns that the NCC has with the current Bill this will be very hard work. However it is a priority for NCC this year because if history is an indicator the new legislation may apply for the next one hundred years.

Jen Guice, Water Policy Coordinator, Nature Conservation Council of NSW, 9279 2522, jguice@nccnsw.org.au

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WATER LEGISLATION REFORM

A NEW ERA FOR WATER MANAGEMENT IN QUEENSLAND?

On 22nd June the Queensland Government tabled its new water legislation, the *Water Bill 2000*, in Parliament. The *Water Bill 2000* represents a significant shift in Queensland towards greater recognition of the environmental values of our precious river systems. It is due to be passed by Queensland Parliament in mid to late August.

The Queensland Conservation Council (QCC) has been working closely with the EDO (Qld) and WWF to ensure that this new legislation provides a legal framework to encourage and achieve sustainable management of our water resources. QCC commends the Queensland Government's willingness to actively consult with conservation groups throughout the Bill's development and to incorporate many of our suggestions in strengthening the Bill's environmental credibility.

Whilst the *Water Bill 2000* signifies a laudable shift in Queensland's water policy direction, QCC believes it still contains a number of crucial flaws. One issue on which we remain particularly concerned is the issue of access rights to "bed and banks". Despite the new legislation stating "bed and banks" as being the property of the State, the Bill appears to be handing bed and bank access rights of watercourses to adjoining property owners. This has implications for all people wishing to access the "State's" watercourses but also has major implications for traditional owners and their rights for customary access. With a number of our member groups, QCC will be continuing to push the Government to address this crucial issue.

The Bill also sets the framework in which Queensland's water reform planning process will proceed. A number of Draft Water Resource Plans (WAMPs and WMPs) have been released in the last couple of months. These plans are designed to plan for the allocation and management of Queensland's water. They supposedly advance sustainable management of our water resources to meet Queensland's future water requirements, including the protection of natural ecosystems and security of supply to water users. However, QCC has major reservations concerning the quality and environmental integrity of the draft plans being released and the processes being used to progress the development of the plans. We will be working hard to ensure that these plans place environmental values as a priority for protection, not just something that can be afforded minimal consideration.

The Water Bill 2000 can be viewed at:

www.legislation.qld.gov.au/Bills/49PDF/WaterB00.pdf

Fur further information regarding Queensland's water reform process please contact Kerryn O'Conor, Rivers Project Officer, Queensland Conservation Council, Brisbane, Ph: 07 3221 0188, rivers@qccqld.org.au

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MORE FLOODPLAIN DEVELOPMENT

A proposal to construct levees and irrigate cotton on the on the property 'Wongwie' on the lower Gingham watercourse is currently being considered by the Moree office of the Department of Land and Water Conservation. The Gingham is in the Gwydir valley in northern NSW, west of Moree. The proposed development will excise an area 2 km wide by 3.8 km from the floodplain within levees up to 2 m high. In addition it is situated on a main flow path in the lower Gwydir watercourse and will increase flood heights in adjacent properties. This has the potential to create a domino effect amongst neighbouring landholders as they seek to protect cropping land from flooding by also raising levee banks.

The property is located about 5 km downstream of wetlands listed on the Ramsar Convention as being of international importance for waterfowl. A significant number of trees lie within the area proposed for cultivation. The development is claimed to be necessary for protecting planned cropping areas from flooding - which stands to reason should cotton irrigation be permitted in such a critical area of the floodplain. However IRN considers that the further spread of cotton and cropping into such important areas should not be permitted. It seems ridiculous on the one hand for government to be trying to improve floodplain management provisions in the *Water Management Bill 2000* whilst on the other to be considering permitting more levees smack in the middle of a floodway.

DLWC should not permit this development to proceed. To do so would open the floodgates on more floodplain works when the State Weir Review Committee is considering how to reduce the impacts of structures on aquatic environments. The Floodplain Wetlands Management Strategy for the Murray-Darling Basin states that '*lake-bed cropping [should be] compatible with the natural distribution of floodwaters*' (Objective 4, page 12). IRN asks how can a crop be compatible with natural flooding patterns if it needs a two metre high levee around it to survive?

IRN considers that this development should not be permitted to proceed. To do so could conceivably start a bout of levee building across the lower Gingham and even greater changes to flow patterns.

Stuart Blanch, Coordinator, Inland Rivers Network, Ph 02 9241 6267.

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assessment under the EPBC Act. As a last resort, it is also possible to apply to the Federal Court for an injunction to prevent the action – and if necessary, an order to repair or mitigate damage to the environment. Your State's Environmental Defenders' Office can be consulted to provide appropriate assistance and advice.

Other conservation tools under the EPBC Act

Other measures under the EPBC Act that people concerned about conserving wetlands and inland river systems should consider include:

- Nominating threatened species and ecological communities for listing under the EPBC Act using the forms available (from mid August 2000) at <http://www.biodiversity.environment.gov.au/wildlife/epbc-front.html>
- Commonwealth listing will not only result in increased protection for those species and communities, but also obligations on the Commonwealth to prepare recovery plans for those species and ecological communities;
- Working with landholders to seek agreement to nominate appropriate wetland sites for Ramsar listing using the criteria and Ramsar Information Sheet at http://ramsar.org/index_key_docs.htm#ris
- WWF has set precedents and published case studies of this process in Australia;
- Nominating key threatening processes under the EPBC Act, which may result in the preparation and implementation of a threat abatement plan for those processes.

Sophie Chapple, Environmental Legislation Coordinator, EPBC Unit, World Wide Fund for Nature (Australia) and Humane Society International, 15/71 Constitution Avenue, Campbell ACT 2612, Ph 02 6257 4010 Fax 02 6257 4030, email: schapple@wwf.org.au

IRN's SUBMISSION TO THE NSW INDEPENDENT PRICING AND REGULATORY TRIBUNAL'S REVIEW OF BULK WATER PRICES FROM 1 JULY, 2000

The Council of Australian Governments' reform of water management identifies July 2001 as a date by which full cost recover is to be attained in surface water delivery. Arrangements for asset refurbishment or upgrading are also to be in place.

The costs of refurbishing headwork storages and instream structures to comply with legal obligations and policy commitments for conserving and restoring rivers should be recovered from water users. For such works and activities that do not relate solely to the provision of water for irrigation, costs should be recovered to the extent that those

works and activities relate to the provision of water to irrigators.

In general, these works and activities include the construction of the following:

Methods for mitigating thermal pollution;

Cold water releases from the bottom of dams can lower water temperatures by 5-12° C below normal for up to 300 km below a storage¹. Native fish are unable to spawn or suffer reduced spawning success at these temperatures. In addition, accumulation of body weight has been found to be up to 90% lower under such circumstances in juvenile silver perch.

According to a Department of Public Works and Services report² in 1996 the dams identified (see Table) require the addition of a vertical level off-take or alternative means of mitigating thermal pollution. These are listed in order of priority as determined in the report.

Vertical level off-takes are the most expensive option for mitigating thermal pollution. A May 2000 report by CSIRO Land & Water³ (read the report's summary in this issue) documents price:performance information for seven methodologies for mitigating thermal pollution. This report priced the construction and installation of draft tube mixers, which were identified as the preferred methodology, on Burrendong Dam at approximately \$2.2-3 m plus \$40, 000 p.a. running costs. This compares very favourably with the upper estimate for a vertical level off-take of \$25 m in the accompanying table but still represents a substantial cost.

Removal or modification of weirs and construction of fishways on necessary weirs

The State Weir Review Committee is in the process of conducting an initial assessment of weirs throughout the state. Preliminary assessments indicate that a significant number of weirs in each major catchment warrant investigation for potential removal, alteration or addition of a fishway.

The cost of these activities and works may range from as little as a few thousands of dollars for the removal of a small weir to several millions of dollars for alterations to a large weir to reduce ecological impacts. For example, replacement of a weir and addition of a fishway on the Broken River in northern Victoria has recently been costed at \$450, 000.

Many of these weirs are owned by State Water for the purposes of supplying water to irrigators (State Water manages 264 weirs throughout NSW). The costs of these activities and works should be recovered from water users to the extent that the structure was built, maintained and operated for the purpose of bulk water delivery for irrigation. If this were to be estimated as the proportion of the water so delivered being used by irrigators, as opposed to use by towns and industry, then it is likely that in excess of 90% of the costs for such activities and works should be borne by irrigators.

All major weirs, such as those for re-regulating irrigation releases on major rivers and creeks, require a fishway. NSW Fisheries estimate that the vertical slot design fishway, which is preferred for large structures on lowland rivers, costs *approximately* \$100,000 for every 1 m of weir height. Hence a three metre high weir would require a fishway costing in the order of \$300,000.

To illustrate the importance of mitigating thermal pollution and reducing the impacts of weirs on rivers, the following are excerpts from determinations by the NSW Fisheries Scientific Committee on probable causes of decline for one or more of the native species Macquarie perch, silver perch and southern pygmy perch. Macquarie perch is listed as a vulnerable species under the *NSW Fisheries Management Act 1994*, whilst the latter two species are likely to be listed as vulnerable by the end of the year:

- Increased egg mortality in **weir** pool environments caused by lack of water movement;
- Construction of barriers to migration and recolonisation such as **weirs and dams** without fishways; and,
- Spawning failures due to cold water releases from **dams**.

Once a species is listed as 'threatened' under the FMA, species recovery plans must be produced and implemented. As these plans are statutory documents they carry significant weight and will facilitate the construction of these works.

Cost recovery and cost sharing for resource management and restoration programs

In addition to the above activities and works, significant public expenditure is committed to funding resource management programs, restoration activities and research in relation to river management and rehabilitation. To the extent that these activities are directly related to the use of rivers for supplying water for irrigation and receiving drainage water, the costs of these activities should be recovered from water users.

Resource management levy

Given that DLWC, and more particularly State Water, are unable at this time to provide costings for these activities and works, levies should be imposed in the interim to permit these necessary activities to be conducted.

IRN proposes the following:

- **\$5.00 per megalitre of entitlement;** and,
- **\$3.00 per megalitre of usage.**

It is grossly impractical to delay the implementation of these works and activities whilst DLWC accurately determines appropriate costs. These will not be available for many years, and in some cases decades. Delaying the raising of funds for such activities will in effect mean that the actions required to reverse the decline in fish stocks as mentioned above will not occur. This is likely to cause regional extinctions of some or perhaps even most of the remaining populations of some species in many of the rivers in which they remain.

A good illustration of the benefits of a levy for resource management and rehabilitation is the \$1.35 per megalitre voluntary payment by irrigators in the Murrumbidgee valley. These funds have been collected over a three year period to form the Water Management Fund which has supported critical research and management into environmental flows in that valley. Importantly the Fund supported high quality research at Charles Sturt University - perhaps the only university research conducted into the delivery of flows for environmental restoration in the state.

Stuart Blanch,

Coordinator, Inland Rivers Network, Ph 02 9241 6267.

References

- 1 Lugg, A, *Eternal winter in our rivers: addressing the issue of cold water pollution*, NSW Fisheries Draft Technical Report, 1999.
- 2 New South Wales Department of Public Works and Services, *Modification of outlet works at DLWC dams, value management study*, March 1996.
- 3 Sherman, B, *Scoping options for mitigating cold water discharges from dams*, May 2000. CSIRO Land and Water Division, Canberra). irn.

FUTURE OF WELLINGTON DAM UNDER CONSIDERATION*

State Water, the commercial business of the Department of Land and Water Conservation, is carefully considering the future of Wellington Dam, which it is proposing to dispose of. Tenders were recently called for the preparation of an Environmental Impact Assessment to consider the options available to resolve safety issues at the dam.

Located approximately 50 km south east of Dubbo on Bushrangers Creek, Wellington Dam does not comply with the safety guidelines published by the NSW Dams Safety Committee. State Water General Manager Abel Immaraj, who is based in Dubbo, said with the Emergency Flood

Dams requiring a vertical level offtake to mitigate thermal pollution*		
Dam	Catchment	Estimated cost (millions of dollars in 1996)
Wyangala	Lachlan	5-10
Blowering	Murrumbidgee	10-15
Burrendong	Macquarie	5-25
Copeton	Gwydir	10-30
Keepit	Namoi	10
Carcoar	Lachlan	3-8

* Source: 1996 Department of Public Works and Services value management study

Warning System almost complete at Wellington Dam, work was now under way to consider whether or not the dam wall should be removed.

"Due to safety concerns, Wellington Dam was temporarily decommissioned about two years ago and since then we have undertaken an extensive process of consultation with the EPA, Wellington Shire Council and other Government agencies to determine the future of the dam," Mr Immaraj said.

"With the EIS due to be completed by November, State Water will then be in a position to consider the impacts of all options, including removal of the dam."

As State Water is considering removing this dam which has been in place for over 100 years, the statutory process, policies and guidelines have been carefully researched.

"We have consulted with a lot of agencies to ensure we have this process planned out correctly," Mr Immaraj said. "As removal of a dam is classified as designated development this proposal is subject to local planning laws and Wellington Shire Council will have the final say in whether or not the wall may be removed."

"The planning laws specify we must submit an EIS with a development application to Council and that the proposal be placed on public exhibition. The exhibition period will take until about the end of this year, when Council will have to decide whether or not to approve the removal of the dam wall and also where the concrete rubble from the demolition can be disposed."

One option is for Council to use some of the rubble to help shore up the historic polo fields on the banks of the Bell River. "Assuming Council gives the go ahead for the removal of the dam wall, State Water will prepare contract documents for this work early in 2001 and then call tenders," Mr Immaraj said.

"There is also a build up of silt behind the dam wall which has to be stabilised so there is no impact downstream. We are still considering whether the best option is to cart some or all of this silt away or leave it where it is - each option requires some stabilisation work and restoration of the area around the dam wall."

Mr Immaraj said if removing the dam wall was the best option for safety, economic and environmental reasons, work could be completed by the end of June 2001.

State Water is a commercial business of the Department of Land and Water Conservation. It was established in response to a COAG agreement and NSW water reforms.

For more information please contact Donna Ambler, Government & Customer Liaison Officer, State Water, Dubbo, Ph 02 6841 7522, dambler@dlwensw.gov.au.

**This article was kindly provided by State Water with whom IRN has been discussing options for weir and dam management and removal. State Water owns 14 minor dams which have significant safety hazard problems and which are being considered for removal.*

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VICTORIAN FISH COMMUNITY LISTED AS VULNERABLE

The lowland riverine fish community of the southern Murray-Darling Basin recommended as a vulnerable community

Under the Victorian *Flora and Fauna Guarantee Act 1988*, the Scientific Advisory Committee's final recommendation on a nomination for listing lowland riverine fish community of the southern Murray-Darling Basin has been released.

After a long consultation period the Victorian Scientific Advisory Committee has proposed to list the lowland riverine fish community of the Murray-Darling Basin (Victorian section) as a **vulnerable ecological community**. The SAC was established under the *Flora and Fauna Guarantee Act (1988)*. The recommendation is summarised below.

The Lowland Riverine Fish Community of the southern Murray-Darling Basin is defined by reference to the geographical area that defines its distribution, and by a selected suite of native fish taxa that is characteristic of and naturally restricted to this geographic area. The geographic area that constrains this fish assemblage can be broadly defined as the lowland reaches and associated floodplains of the Murray River tributaries (Victoria) draining the northern slopes of the great Dividing Range, together with the lowland section and floodplain of the Murray River upstream of the South Australian border. The streams involved are: Mitta Mitta, Ovens, Broken, Goulburn, Campaspe, Loddon and Avoca.

The taxa referred to in this fish assemblage are those that have their natural Victorian distribution wholly within the defined geographic area. The fish fauna includes 15 native fish species, several of which have been listed on Schedule 2 of the *Flora and Fauna Guarantee Act 1988*.

Eligibility for listing as a community under the *Flora and Fauna Guarantee Act 1988*

Evidence that criteria are satisfied:

1. The community is in a demonstrable state of decline which is likely to result in a significant loss of its component taxa.

Evidence:

The distribution of most of the native fish species identified in the nomination has declined markedly since records began. Eight of the fifteen species within the community have already been listed on schedule 2 of the Act. One species (Agassiz's Chanda Perch) has been lost completely while the Southern Purple-spotted Gudgeon exists only within an artificially created irrigation drainage basin. There is no question that the taxa identified in the fish community have declined across the range of the Southern Murray-Darling Basin.

2. The community's composition has altered markedly in a short time and the alteration is continuing.

Evidence:

The variety of native fish species identified in the nomination has changed dramatically in the basin. The community has changed considerably through the extinction of two member species and also through the presence of the exotic carp which is now a dominant species both numerically and in terms of biomass.

3. The community is significantly prone to future threats which are likely to result in extinction.

Evidence:

The community is subject to the impacts of water regulation through:

- Alteration to natural flow regimes;
- Alteration to natural temperature regimes;
- Barriers to fish migration; and
- Waterway management practices involving the removal of large woody debris.

Each of these threats has been listed on Schedule 3 of the *Flora and Fauna Guarantee Act 1988*. The community is also under threat from the continued presence of introduced fish, including European carp.

4. The threat is currently operating and is expected to operate at a level in the future which is likely to result in the extinction of the community.

Evidence:

The use of water in northern Victoria for irrigation, and thus water regulation and water retention within large storages, is a permanent feature of water resource management. The impacts of water regulation, particularly in relation to the alteration of natural flows and temperatures are therefore ongoing. The effect of dams and weirs as barriers to migration is also an ongoing threat. Waterway management practices continue to include the removal of woody debris, or its relocation within the river channel. The ecological effects of previous de-snagging programs are

permanent and natural re-snagging will only occur over millennia.

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing

in accordance with Section 11(1) of the Act because the four criteria above have been satisfied. The SAC also therefore concludes that as a consequence the community warrants listing as a vulnerable ecological community on Schedule 2 of the *Flora and Fauna Guarantee Act 1988*.

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Legacy of poor land and catchment management in the southern Murray-Darling Basin.

One species has already disappeared with another eight of the 15 fish species under real threat of localised or regional extinction.

Common name	Classification (1999)*
Agassiz's Chanda Perch	Extinct
Silver Perch	Critically endangered
Southern Purple-spotted Gudgeon	Critically endangered
Trout Cod	Critically endangered
Murray Hardyhead	Endangered
Macquarie Perch	Endangered
Freshwater Catfish	Vulnerable
Murray Cod	Vulnerable
Golden Perch	Vulnerable
Flat-headed Galaxias	Data deficient
Non-specked Hardyhead	(not classified)
Western Carp Gudgeon	(not classified)
Murray Rainbow Fish	(not classified)
Bony Bream	(not classified)
Flat-headed Gudgeon	(not classified)

**by the Victorian Department of Natural Resources and Environment.*

ANOTHER ENDANGERED FISH SPECIES IN NSW

The Murray Hardyhead proposed to be recommended as an endangered species

The NSW Fisheries Scientific Committee is proposing to make a recommendation to list Murray hardyhead as an **endangered species** in Schedule 4 of the *NSW Fisheries Management Act 1994*. The following is a summary of the Committee's proposed recommendation.

The Committee is of the opinion that in view of the evidence of a serious population decline to the point that it is **now absent in the wild from the majority of the waters of the lower Murray river drainage system in NSW**, the continuing impediments to successful reproduction, habitat changes and threats of predation, the numbers of Murray Hardyhead have been reduced to such a critical level that it is in immediate danger of extinction in NSW.

The Fisheries Scientific Committee has found that:

Murray hardyhead has been recorded in the lower reaches of the Murray drainage system. It is a small, moderately deep bodied fish, generally less than 7 cm in length.

The species was reported to be widespread and abundant throughout the lower reaches of the Murray drainage system. **The species has suffered a serious population decline in NSW such that no populations are currently**

known. Despite considerable efforts by scientists over the past 20 years to collect the species in NSW waters, the last recorded museum specimen was from the 1970s.

Murray hardyhead has the following **official conservation status**:

- Listed as threatened in Victoria;
- Listed as endangered in the IUCN Red List of Threatened Species; and
- Listed as 'potentially threatened' by the Australian Society for Fish Biology.

The **causes of decline** in Murray hardyhead are unknown but may include:

- Habitat changes due to agricultural practices;
- Spawning failures due to cold water releases from dams;
- Predation by, and competition with, introduced species such as redfin perch and gambusia; and
- Construction of barriers to migration and recolonisation such as weirs and dams without fishways.

Hence the Fisheries Scientific Committee is of the opinion that the numbers of Murray hardyhead have been reduced to such a critical level that it is in **immediate danger of extinction in NSW.**

Therefore the species qualifies for inclusion in Part 1 of Schedule 4 of the Fisheries Management Act 1994 as an **ENDANGERED SPECIES.**

Copies of the proposed recommendation may be inspected at the FSC's website www.fsc.nsw.gov.au or at NSW Fisheries regional offices. Submissions must be received by Friday, 25 August 2000. For further information contact: Kylie Russell on 02 4916 3817.

IRN notes that if listed as endangered, this will be the third inland fish listed as endangered in NSW, joining trout cod and Oxleyan pygmy perch. In addition, up to another species are likely to be listed as vulnerable in NSW in the next few months: Macquarie perch are already listed, and silver perch and southern pygmy perch likely to be listed by the end of the year.

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SCOPING OPTIONS FOR MITIGATING COLD WATER DISCHARGES FROM DAMS

This article summarises a report by Dr Bradford Sherman, CSIRO Land and Water, Canberra, to: Agriculture, Fisheries and Forestry - Australia, NSW Fisheries, CRC for Freshwater Ecology, and NSW Department of Land and Water Conservation as part of the NHT Murray-Darling 2001 FishRehab Program. Released in May 2000.

Background

Cold water pollution is believed to be a major environmental problem below most Australian dams and is especially bad below the large dams used to supply water for irrigation. During summer, thermal stratification in these reservoirs typically exceeds 12 °C between the surface and the bottom, with hypolimnion (the cold lower region) temperatures scarcely warmer than during winter. Cold water pollution occurs below these dams whenever water is released because these dams were constructed with only a single outlet located near the bottom. The 8-12 °C depression in river temperature from 'natural' conditions immediately below these dams leaves a cold legacy extending many hundreds of kilometres downstream. The Mitta Mitta, Murrumbidgee, Murray, and Macquarie rivers are all significantly affected by cold water pollution.

Unnaturally low temperatures impact on the whole gamut of biological and chemical processes in lakes and rivers. Artificially low temperatures slow metabolic processes in organisms ranging from phytoplankton to benthic invertebrates and fish. Cold water pollution is known to interfere with the feeding, growth, survival and reproduction of Australian native fish. Through the mid-1990's, water resource managers assumed that retrofitting dams with multi-level outlet structures was the only

feasible approach to mitigating cold water pollution. Such retrofitting was found to be unacceptably expensive for the benefits it accorded.

What are the engineering options?

In this report, I review six alternative cold water pollution mitigation measures:

- **Artificial destratification** by mechanical mixing of the water column;
- **Trunnions** (Pipes hinged at the outlet so that the free end can be positioned to draw water from different levels in the water column.);

Cold Water Pollution - how much will it cost to fix up?

A case study was carried out for Burrendong Reservoir, a major dam providing large irrigation and hydropower releases in the Macquarie catchment in northern NSW. Draft tube mixers were found to provide the best price:performance of all the mitigation methods. A demonstration system capable of delivering the maximum discharge is estimated to cost \$2.2m (including \$750,000 for contingencies) to construct and roughly \$40,000 p.a. to operate. This compares with an estimated cost of \$25m to retrofit the dam with a multi-level outlet structure. Hence the cost for the mixer system is less than 1/10th that required to retrofit the dam with a multi-level outlet.

- **Surface pumps** (Large fan-like propellers that pump warm surface layer water into existing outlets.);
- **Draft tube mixers** (Similar in operating principle to surface pumps but with the addition of a vertical tube through which the pumped water travels on the way to the outlet.);
- **Submerged curtains** (Large curtains made of robust, flexible rubber fabric extending upwards from the bottom of the reservoir so that they surround an existing outlet forcing all release water to originate from above the top of the curtain.);
- **Stilling basins** (Expansive shallow ponds through which discharge passes so that it may warm up by exposure to the sun prior to entering the river.)

The pros and cons of the different strategies and estimates of capital and operating costs are summarised in the accompanying Table. Prices are estimates for Burrendong Reservoir (1678 GL).

For major reservoirs with large irrigation or hydropower releases, draft tube mixers and submerged curtains provide economically attractive alternatives to retrofitting multi-level

outlet structures. Both methods are believed to be capable of increasing discharge temperatures by up to 9 °C under typical summer stratified conditions. Draft tube mixers allow the greatest operational flexibility.

Both technologies are suitable for reservoirs of any size.

For small-to-medium sized reservoirs, destratification and trunnions may be feasible as well. Trunnions are only capable of carrying relatively small flows such as required for town water supplies. Retrofitting dams with trunnions can be fairly expensive; in many regards the task is similar to retrofitting a dam with a multi-level outlet in that some of the construction must take place underwater.

Destratification can increase temperatures relatively quickly, but must be used continuously to prevent potentially toxic sulphide-rich water from being released downstream.

Stilling basins are not feasible due the probable lack of suitably large tracts of land required for satisfactory thermal performance.

No one technology can be recommended as always providing the best price:performance ratio. Site specific characteristics must be taken into account whenever assessing alternative techniques.

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Summary of cold water pollution mitigation techniques. Costs are estimates for Burrendong Dam*.

Method	Capital Cost	Annual Operating Cost	Temperature Increase (°C)	Pros and cons
Destratification	\$1.5 m	\$75 K - \$300 K	8	Feasibility decreases with increasing reservoir size. Increased hypolimnion temperature increases oxygen demand, nutrient release, H ₂ S production if not operated continuously from spring-autumn.
Selective withdrawal (Vertical level offtakes)	\$25 m	nil	7-9	Most expensive of feasible alternatives. Allows avoidance of surface layer contaminants such as blue-green algae.
Surface pumps (Draft tube mixers)	\$0.75 m-1.5 m	\$40 K-60 K	5-9	Offers the most operational flexibility including 'do nothing' option. Some concern regarding resuspension of bottom sediments.
Submerged curtain	\$3 m	unknown, < \$30 K	9	Suitable when not subjected to strong currents (flood event flows). Very simple, no moving parts - always operates. Some uncertainty regarding maintenance costs.
Trunnions	\$0.8 m	nil	9	Not suitable for discharges > 100 ML/d. Deeper reservoirs may require multiple trunnions and a multi-level outlet.
Stilling basins				Not feasible due to space and cost constraints.

*The annual operating cost does not include replacement at the end of a system's design life. The expected minimum life for all systems is at least 10-20 years. The temperature increase is the expected maximum temperature gain assuming an overall water column temperature change of 10°C.

THE BIDGEE - BRINGING BACK THE FISH

This article summarises an issues paper prepared by Allan Lugg, Senior Conservation Manager, NSW Fisheries, for the Murrumbidgee River Management Committee and the Murrumbidgee Unregulated Streams Management Committee.

Background

Like other major rivers in the southern part of the Murray-Darling Basin, the Murrumbidgee River has suffered a dramatic loss of native fish. The extent and severity of this loss is not widely recognised, often being obscured by anecdotal observations of good catches of recreational species at certain locations.

Sampling by NSW Fisheries and other research bodies over the last few years has shown that most native species have significantly reduced populations and distributions. In contrast, at least seven alien species have become widespread and abundant. Aliens now dominate the fish fauna in terms of both numbers and biomass.

Three native species (southern pygmy perch, purple-spotted gudgeon and olive perchlet) appear to have become extinct within the system. Trout cod also became extinct, was re-introduced by means of artificial propagation and stocking, but has not achieved self-sustaining status. Murray hardyhead is extremely rare with only one specimen captured in recent years despite extensive sampling. The natural population of silver perch is most probably extinct.

Other formerly widespread and abundant species (freshwater catfish, Macquarie perch, Murray cod, river blackfish) now only survive as isolated populations in the most favourable habitats, or as single individuals or small groups scattered throughout the system.

What can be done?

The two issues of highest priority are mitigating cold water pollution from both Burrinjuck and Blowering Dams and addressing problems caused by barriers. Fortunately there are technically feasible solutions to both problems. Unfortunately the solutions are expensive.

Multi-level off-takes or alternative solutions that allow warm water to be released downstream need to be constructed on both dams as a matter of urgency. While such structures

will be costly there is little possibility that native fish populations can be restored in their absence, since lower water temperatures appear to be the most important factor limiting to fish breeding success in the upstream half of the regulated system.

Effective fishways on all the major weirs (Balranald, Redbank, Maude, Gogeldrie, Yanco and Berembled) along the main river and many of the smaller weirs on anabranches and tributaries, especially the Billabong and Yanco creeks, are required to re-establish migration pathways and allow native fish breeding.

The broad scale establishment of riparian buffer zones along streams and drainage lines to filter and capture sediment and associated nutrients before they reach the stream is an absolute necessity.

Re-establishment of more natural flow regimes across the valley would also assist native fish at the expense of alien species such as carp. Enhancement of 'out-of-bank' flows is the most important in the regulated

system, while protection of low flows is the most important in the unregulated system.

Restocking with hatchery bred fish presently holds little promise for restoring native fish populations and biodiversity. The habitat is currently so poor in many areas that survival and growth to adulthood let alone reproduction is unlikely.

Summary of what action is required:

1. Mitigate thermal pollution from Blowering and Burrinjuck Dams;

Causes of decline for fish in the Bidgee

The cause of this decline is a combination of adverse factors operating individually and synergistically over the last 150 to 160 years including

- **Historical overfishing;**
- **Predation** by and competition with trout, redfin perch and tench;
- Establishment of myriad (over 450) **barriers** (weirs, dams, culverts and causeways) which obstruct or prevent both long and short distance migration;
- **Desnagging**, especially during the paddlesteamer era;
- **Alienation of floodplain** habitats by flood levees, block banks, etc;
- Widespread catchment **erosion** with subsequent siltation of gravel beds and deep holes;
- Degradation and loss of riparian and floodplain **vegetation;**
- Episodes of **pollution** and contamination of waters;
- Storage and subsequent extraction of large volumes of water resulting in reduced **frequency, duration, magnitude and extent of floods;**
- Storage and subsequent extraction of large volumes of water resulting in **reversal of flow regimes;**
- **Loss of natural flow variability**, especially at monthly and annual time scales;
- **Chronic cold water pollution;** and
- **Predation** by and competition with other alien species (eg. carp and oriental weather loach)

2. Effective fishways on the seven main weirs;
3. Riparian buffer zones of native vegetation; and,
4. Review of weir operation protocols to assess possibilities for reducing thermal pollution and increase water level fluctuations.

Have your say

The Water Reforms allow environmental groups and the wider community an important role in improving the state of our rivers. To foster a greater exchange of views, opinions and information in this process, IRN will consider all comments from landholders, community groups and water users for publication in the *Forum* column of IRN NEWS. We welcome contributions concerning changes in river or wetland health since alterations to flow, opinions on restoration strategies, or how a river's health has improved following institution of the Water Reforms. Please send all articles to the address given at the bottom of the page.

IRN is a network of conservation groups and individuals with a goal of restoring and conserving the biological diversity, natural functioning and health of the inland rivers and wetlands of NSW. Together with local and regional environmental groups, IRN seeks to promote a greater understanding amongst landholders, inland communities and government of the threats to inland rivers of unsustainable land and water management practices. Member organisations on the Steering Committee include the Australian Conservation Foundation, Nature Conservation Council of NSW, National Parks Association of NSW, Coast and Wetlands Society, and Friends of the Earth.

Are you concerned about the health of inland rivers and wetlands? Do you want to assist IRN in obtaining the best outcome for both the environment and rural industries and communities over the long term? If you would like to help us in our work, please contact us or send your donation to 'Water for the Rivers Fund', Inland Rivers Network, 33 George St, SYDNEY, 2000.

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