

# INLAND RIVERS NETWORK



## News

A Quarterly Newsletter of the Inland Rivers Network

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## EDITORIAL

*“Even if we get the science 100% right, it still only makes up about 10% of the solution to environmental problems.”*

These rather insightful words from one of my lecturers at Monash University where I recently completed some mature-age study have frequently come echoing back to me since taking over the position as Coordinator of the IRN. That is not to say that the scientific aspect of environmental issues is not important – it is; profoundly so. Whilst science may not be the perfect tool for understanding our world and its processes, it's as good as we've got. Unfortunately our social and economic systems are so intricate and interdependent that even to bring about relatively small environmental changes for the benefit of our surrounding ecology is immensely complicated. Needless to say, the last three months or so at the interface of the environmental movement have been an incredibly steep learning curve, and I have much to thank Stuart Blanch for in making the transition so much easier.

In retrospect though it has been an incredibly interesting transition to make from my previous position on the academic staff at RMIT University where I lectured and developed

curriculum in ecology and regional sustainability. Whilst I would have liked to think that when I was in that job, I was putting as practical a spin on my lectures as I could, looking back from my current position, the reality is far from it. Yes the definitions of sustainable development are more or less the same – all of them contain the concepts of *simultaneously and equally* achieving ecological, social and economic development that meet the needs of present generations without compromising the ability of future generations to meet their own needs.

However sustainability now involves so much more than just asking ourselves what sort of planet do we want to live in and for future generations to inherit - that question was asked at Stockholm in 1972. Given the trends evident almost 30 years ago, they didn't like what they saw. One of the greatest threats to sustainable development now is that we take it so much for granted because it has been with us for so long. The real difficulty and challenge arises in its implementation.

Consequently we have Rod Welford, the former Queensland Minister for Environment and Heritage and Minister for Natural Resources hailing the draft Condamine-Balonne WAMP as “... part of a new era in water resource management in Queensland. For the first time, a comprehensive basin-wide plan has been developed that

### In this issue of IRN News:

**Feature Article: Growing more food with less water**

**NSW Water Management Act 2000 · RMC Reports · NSW State of the Environment Report**

**New Queensland Government and dams · Victorian River Health Strategy**

**Threatening Processes for native fish in NSW · Effects of willows on biodiversity**

**World Commission on Dams Report · Thermal Pollution Workshop**

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will become the blueprint for ecologically sustainable development in the region for years to come” (p.3).

The Condamine-Balonne WAMP, in all of its ‘Environmental Flow Assessments’ at each node identifies an ‘Environmental Flow Limit’ (EFL) below which there is “an increased risk of unacceptable environmental degradation”. Despite this, and as a direct contradiction to what Minster Welford says in his foreword address and which was one of the key objectives in its development (p.9), the Condamine-Balonne WAMP states: "It should be noted that none of the thresholds are expected to restore all environmental flow performance indicators back to the environmental flow limits during the life of this Plan. To achieve this would require an average reduction over the long-term in current water diversions throughout the basin of over 40%, a change considered unlikely to be achievable within the life of this Plan without major adverse social and economic impacts" (p.21).

I’m sorry Mr Welford but I cannot agree with you, or anyone else for that matter who does not *simultaneously and equally* consider the ecological, social and economic implications of any proposed ‘development’. The Condamine-Balonne WAMP is yet another example of ecological systems being sacrificed for economic and social objectives brought about through mismanagement of natural resources, and as such **does not** represent long-term economic and social sustainable development let alone ecological/environmental sustainability. If we are going to get serious about this whole concept of sustainability, then

we have to stop fiddling around on the margins and start applying the definition more rigorously.

If any species is threatened with extinction on account of human activity, then it simply is not sustainable. Irrespective of how you believe life came into existence on Earth, as just one species on this planet we do not have the right to bring about the extinction of another species. On second thoughts, we have just one - ‘Because we can’. As perhaps the only species capable of detailed reason and cognition of the implication of our actions, I don’t believe that this so-called ‘right’ stands up to any reasonable scrutiny.

As evidenced by publications such as the ACF’s *Natural Advantage: a blueprint for a sustainable Australia*, the conservation movement is serious about working towards sustainability. I wouldn’t like to be so arrogant to say that the conservation movement was at the cutting edge of scientific endeavour in our path towards the rigorous application of sustainable development - that is the role and responsibility of our scientists. We are however at the interface between science and the broader community and hopefully we can act as a conduit for the dissemination of new ideas and information. For me, the exciting aspect of working with the IRN is that for so many regions, rivers are not only community icons but they are also barometers for the health of the surrounding terrestrial ecosystems. I hope you enjoy reading this issue of the Inland Rivers Network News and look forward to meeting you ‘on a river somewhere’.

*Greg Williams, Inland Rivers Network Coordinator*

CONTENTS			
<b>Editorial</b>	1	Macquarie Catchment RMCs Update	12
<b>Feature Article</b>		<b>Threatened freshwater biodiversity</b>	
Growing more food with less water	3	Threatened freshwater species in NSW	14
		Threatening processes for fish in NSW	14
<b>Water Reform News</b>		Threatened freshwater species in Victoria	15
New ways of managing water in NSW	5	Willows shown to impact on freshwater fauna	15
NSW State of the Environment Report	6	Water regime of wetland and floodplain plants	16
Needed: the most significant single ever investment program in Australia	6		
New irrigated cotton threat to Macquarie Marshes	7	<b>International News</b>	
Measuring Environmental Flows	8	World Commission on Dams Report	17
Victorian River Health Strategy	9		
That Dam Election!	10	<b>Conferences and Workshops</b>	
Barwon-Darling RMC Update	11	Thermal Pollution Workshop	19
Murray-Lower Darling Community Reference Committee Update	11		

# FEATURE ARTICLE

# GROWING MORE FOOD WITH LESS WATER

## SANDRA POSTEL

Six thousand years ago farmers in Mesopotamia dug a ditch to divert water from the Euphrates River. With that successful effort to satisfy their thirsty crops, they went on to form the world's first irrigation-based civilization. This story of the ancient Sumerians is well known. What is not so well known is that Sumeria was one of the earliest civilizations to crumble in part because of the consequences of irrigation.

Sumerian farmers harvested plentiful wheat and barley crops for some 2,000 years thanks to the extra water brought in from the river, but the soil eventually succumbed to salinization—the toxic buildup of salts and other impurities left behind when water evaporates. Many historians argue that the poisoned soil, which could not support sufficient food production, figured prominently in the society's decline.

Far more people depend on irrigation in the modern world than did in ancient Sumeria. About 40 percent of the world's food now grows in irrigated soils, which make up 18 percent of global cropland. Farmers who irrigate can typically reap two or three harvests every year and get higher crop yields. As a result, the spread of irrigation has been a key factor behind the near tripling of global grain production since 1950. Done correctly, irrigation will continue to play a leading role in feeding the world, but as history shows, dependence on irrigated agriculture also entails significant risks.

Today irrigation accounts for two thirds of water use worldwide and as much as 90 percent in many developing countries. Meeting the crop demands projected for 2025, when the planet's population is expected to reach eight billion, could require an additional 192 cubic miles of water—a volume nearly equivalent to the annual flow of the Nile 10 times over. No one yet knows how to supply that much additional water in a way that protects supplies for future use.

Severe water scarcity presents the single biggest threat to future food production. Even now many freshwater sources—underground aquifers and rivers—are stressed beyond their limits. As much as 8 percent of food crops grows on farms that use groundwater faster than the aquifers are replenished, and many large rivers are so heavily diverted that they don't reach the sea for much of the year. As the number of urban dwellers climbs to five billion by 2025, farmers will have to compete even more

aggressively with cities and industry for shrinking resources.

Despite these challenges, agricultural specialists are counting on irrigated land to produce most of the additional food that will be needed worldwide. Better management of soil and water, along with creative cropping patterns, can boost production from cropland that is watered only by rainfall, but the heaviest burden will fall on irrigated land. To fulfill its potential, irrigated agriculture requires a thorough redesign organized around two primary goals: cut water demands of mainstream agriculture and bring low-cost irrigation to poor farmers.

Fortunately, a great deal of room exists for improving the productivity of water used in agriculture. A first line of attack is to increase irrigation efficiency. At present, most farmers irrigate their crops by flooding their fields or channelling the water down parallel furrows, relying on gravity to move the water across the land. The plants absorb only a small fraction of the water; the rest drains into rivers or aquifers, or evaporates. In many locations this practice not only wastes and pollutes water but also degrades the land through erosion, waterlogging and salinization. More efficient and environmentally sound technologies exist that could reduce water demand on farms by up to 50 percent.

Drip systems rank high among irrigation technologies with significant untapped potential. Unlike flooding techniques, drip systems enable farmers to deliver water directly to the plants' roots drop by drop, nearly eliminating waste. The water travels at low pressure through a network of perforated plastic tubing installed on or below the surface of the soil, and it emerges through small holes at a slow but steady pace. Because the plants enjoy an ideal moisture environment, drip irrigation usually offers the added bonus of higher crop yields. Studies in India, Israel, Jordan, Spain and the U.S. have shown time and again that drip irrigation reduces water use by 30 to 70 percent and increases crop yield by 20 to 90 percent compared with flooding methods.

Sprinklers can perform almost as well as drip methods when they are designed properly. Traditional high-pressure irrigation sprinklers spray water high into the air to cover as large a land area as possible. The problem is that the more time the water spends in the air, the more of it evaporates and blows off course before reaching the

plants. In contrast, new low-energy sprinklers deliver water in small doses through nozzles positioned just above the ground. Numerous farmers in Texas who have installed such sprinklers have found that their plants absorb 90 to 95 percent of the water that leaves the sprinkler nozzle.

Despite these impressive payoffs, sprinklers service only 10 to 15 percent of the world's irrigated fields, and drip systems account for just over 1 percent. The higher costs of these technologies (relative to simple flooding methods) have been a barrier to their spread, but so has the prevalence of national water policies that discourage rather than foster efficient water use. Many governments have set very low prices for publicly supplied irrigation, leaving farmers with little motivation to invest in ways to conserve water or to improve efficiency. Most authorities have also failed to regulate groundwater pumping, even in regions where aquifers are overtapped. Farmers might be inclined to conserve their own water supplies if they could profit from selling the surplus, but a number of countries prohibit or discourage this practice.

Efforts aside from irrigation technologies can also help reduce agricultural demand for water. Much potential lies in scheduling the timing of irrigation to more precisely match plants' water needs. Measurements of climate factors such as temperature and precipitation can be fed into a computer that calculates how much water a typical plant is consuming. Farmers can use this figure to determine, quite accurately, when and how much to irrigate their particular crops throughout the growing season. A 1995 survey conducted by the University of California at Berkeley found that, on average, farmers in California who used this tool reduced water use by 13 percent and achieved an 8 percent increase in yield—a big gain in water productivity.

An obvious way to get more benefit out of water is to use it more than once. Some communities use recycled wastewater. Treated wastewater accounts for 30 percent of Israel's agricultural water supply, for instance, and this share is expected to climb to 80 percent by 2025. Developing new crop varieties offers potential as well. The widespread adoption of high-yielding and early-maturing rice varieties has led to a roughly threefold increase in the amount of rice harvested per unit of water consumed—a tremendous achievement.

Yet another way to do more with less water is to reconfigure our diets. The typical North American diet, with its large share of animal products, requires twice as much water to produce as the less meat-intensive diets common in many Asian and some European countries. Eating lower on the food chain could allow the same volume of water to feed two Americans instead of one, with no loss in overall nutrition.

Over the next quarter of a century the number of people living in water-stressed countries will climb from 500 million to three billion. New technologies can help farmers around the world supply food for the growing population while simultaneously protecting rivers, lakes and aquifers. But broader societal changes—including slower population growth and reduced consumption—will also be necessary. Beginning with Sumeria, history warns against complacency when it comes to our agricultural foundation. With so many threats to the sustainability and productivity of our modern irrigation base now evident, it is a lesson worth heeding.

Further Information:

Salt and Silt in Ancient Mesopotamian Agriculture. Thorkild Jacobsen and Robert M. Adams in *Science*, Vol. 128, pages 1251–1258; November 21, 1958.

Pillar of Sand: Can the Irrigation Miracle Last? Sandra Postel. W. W. Norton, 1999.

Groundwater in Rural Development. Stephen Foster et al. Technical Paper No. 463. World Bank, Washington, D.C., 2000.

Irrigation and land-use databases are maintained by the United Nations Food and Agriculture Organization at <http://apps.fao.org>

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# WATER REFORM NEWS

## NEW WAYS OF MANAGING WATER IN NSW - THE NEW WATER MANAGEMENT ACT 2000

Now that the Water Management Act 2000 (WMA) has passed through both houses of Parliament and most sections have commenced<sup>1</sup>, through the process of implementation we are soon to see whether this new legislation will deliver real environmental outcomes.

With numerous provisions included in the WMA such as:

- High level objectives
- water sharing principles with an environmental emphasis
- reconsideration of the bulk access regime
- the requirement for the Minister to prepare a State Water Management Outcomes Plan;
- the ability for the Minister to appoint an expert advisory panel with scientific expertise;
- for water management plans to consider a number of specific environment requirements;
- Ministers plans to set bulk access regimes where there is no committee in place or where committees are able to make a determination; and
- The inclusion of auditing and review measures of plans and the implementation of plans;

a framework has been created whereby ecological sustainability is feasible.

However, the true test is yet to come. We eagerly are awaiting for the Department of Land and Water Conservation to provide details of an implementation program. Such a program should include specifics such as whether an expert panel will be established prior to the drafting of the State Water Management Outcomes Plan (SWOMP)<sup>2</sup> to give the process credibility. Given the importance of the determination of the Bulk Access Regime (BAR)<sup>3</sup> it is essential that rules for determining the BAR by committees (or by Minister's plans) be developed with scientific expertise as early as possible.

Other matters which await clarification include processes of auditing and review. While the WMA provides for both auditing and review, little detail has been provided with respect to what each will entail. The review is expected to involve an assessment of the resource and the management regimes that the plan establishes. The audit in contrast is expected to analyse how the provisions of the plan have been given effect to, for example if the environmental flows which the plan requires were in fact delivered.

In the coming months existing Water Management Committees can expect a DLWC initiated short term review of all the water management arrangements in each valley. Also early this year, the Minister for DLWC should be writing to WMC's to provide specific terms of reference to undertake the review of environmental flow rules where they are in place, and to request that WMC's make recommendations to the Government on what should constitute the initial BAR.

To assist in the process of determining standards for details of the SWOMP and environmental water allocations as part of the BAR, NCC will be developing policy and lobbying the Government as a matter of priority. It is hoped that we can move away from the hydrological modelling techniques used in the past for determining environmental flows, to emphasising ecological functions and responses to environmental flow rules.

During these early stages of the implementation of the WMA it is essential that we provide policy input and pressure to ensure the best possible interpretation of this important piece of natural resource management legislation. The proof of any legislation is in its implementation, watch this space!

***By Imogen Schoots, Water Project Officer, NCC***

*NCC and IRN bids farewell to Imogen, who leaves us to travel the world. Imogen has spent the last 12 months working tirelessly for the sustainability of rivers in NSW. Her dedication, innovation and cheer will be missed.*

<sup>1</sup> Sections of the Act which have not yet commenced relate to licensing. Due to the enormous task of transferring licences the commencement of relevant sections has been delayed.

<sup>2</sup> The intention of the SWOMP is to provide guidance and direction for the development, conservation, management and control of the State's water resources in furtherance of the objects of the Act

<sup>3</sup> The Bulk Access Regime (BAR) provides for the extraction of water under access licences which must have regard to the environmental water rules, basic landholder rights (those being domestic and stock rights and harvestable rights) and water allocated for extraction under access licences.

## NSW STATE OF THE ENVIRONMENT REPORT

February saw the release of the NSW State of the Environment 200 Report, the Environment Protection Agency's regular review of the NSW environment. Inland river systems were highlighted as being in particularly poor condition, with the report admitting that "freshwater rivers in NSW may be the most degraded ecosystems, in large part due to the impact of river regulation by dams and weirs. There is very little formal protection for freshwater ecosystems compared with terrestrial ecosystems."

Other key points of this report include:

- Water extracted in 5 inland catchments in 1998-99 exceeded the Cap, and in many other catchments was close to exceeding the Cap.
- Cold water pollution occurs from below 17 major dams.
- Levels of phosphorous in most inland rivers exceeded management targets.
- Introduced species are continuing to threaten aquatic ecosystems.
- The frequency, size and persistence of blue-green algal blooms in NSW waterways have increased over the past 30 years.
- Environmental flow provisions have been established for only 26 of 42 river systems.
- Water quality in the Murray-Darling Basin is fair to poor.
- Only about 20% of the state's wetlands are free from disturbance.

The NSW State Government reacted promptly to this report by halting all irrigation works on the Barwon-Darling. It remains to be seen whether or not this will be followed with decisive action to halt the further degradation of the state's inland rivers and wetlands.

To download a copy of this report, visit [www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

*Craig Woodfield, Inland Rivers Network*

## NEEDED: THE MOST SIGNIFICANT SINGLE INVESTMENT PROGRAM EVER IN AUSTRALIA

The Federal Government must consider imposing a new levy to fund a massive national program to ensure the ongoing health of Australia's crucial water catchments, according to a bipartisan parliamentary report released in February.

The Report, by the House of Representatives Environment Committee, calls for the establishment of a National Catchment Management Authority (NCMA) to deliver Australia's entire catchment management program, from research to planning, funding, implementation and monitoring.

The result of an 18-month inquiry, the report doesn't pull any punches, describing the problem of catchment management as the most pressing public policy issue in contemporary Australia, affecting all Australians, rural and urban.

It says that unless action is taken, Australian's quality of life will suffer dramatically. Affected will be much of Australia's food and water supply, entire regional communities, regional and urban infrastructure (including roads, buildings, pipelines, water and sewerage systems, tourist and recreation areas/attractions), and natural wildlife.

The size of the problem has been identified as requiring at least \$60 billion in capital investment over 10 years, plus ongoing maintenance of about \$500 million per annum (ACF/NFF). Treasury has reportedly estimated the cost of repairing the Murray-Darling Basin alone as at least \$30 billion. These estimates put the annual funding requirement in the region of \$5-\$7 billion.

The Report doesn't recommend a specific level for a levy, but provides an indicative table which suggests how funds could be raised from taxpayers and the private sector, which it says should also be provided with a range of incentives. The environment levy would remain in place for 25 years, and be clearly marked and separated on taxation assessments. The recommendation to consider it received unanimous cross-party support. The levy would fund a nationally co-ordinated approach, led by the Federal Government but requiring the support and involvement of the entire Australian community.

Environmental degradation of Australia's catchment systems has many facets. These include: salinity (dryland salinity, from excessive land clearing, irrigation salinity, urban salinity, river salinity); acidification, from over-fertilisation, and acid sulfate soils which leach poisons into waterways; erosion; eutrophication and algal blooms (some toxic) from excess nutrients; polluted urban stormwater affecting coastal waterways; and pest plants (weeds) and animals. All these facets need to be addressed.

The report identifies myriad problems with the current catchment management approach. It says it is piecemeal and poorly integrated, inconsistent, confusing and inefficient. Fundamental systemic change is needed, with the Commonwealth taking the lead in reforming and

boosting the institutions and funding surrounding catchment management.

While the Committee welcomed the Prime Minister's recent National Action Plan for Salinity and Water Quality (October 2000), it says the plan can and must be strengthened and makes specific recommendations to do that.

Other recommendations include:

- The Australian Law Reform Commission should investigate a complete overhaul of Australia's environmental laws, recommending ways to consolidate them into a consistent, coherent body;
- Establishing Local Catchment Management Authorities (CMAs) for each catchment system, which would be the basic administrative units of the National Authority. Under the CMAs would be local area co-ordinators and catchment management extension officers;
- Setting targets and timeframes, which would be largely legislated and mandatory;
- That all Commonwealth funding be aggregated and coordinated in line with new national plans;
- The current National Land and Water Resources Audit be formally established as an ongoing independent statutory Commonwealth authority called the National Environment Audit Office. It would conduct a comprehensive and ongoing audit of Australia's catchment systems and policies and programs which affect their ecological sustainability. Funding for the Audit should come from general revenue, and not from the National Heritage Trust or be tied to asset sales. All information should be available to the community free-of-charge;
- An audit of all Federal, State and Local Government policies to identify and remove incentives counter-productive to sustainable use (e.g. removal of subsidies for irrigation water);
- All funding to be tied to meeting mandated accreditation levels and targets;
- Complete public exposure of all funding and contracts involving public money.

The Committee recommends the Government in the first instance try to work through a co-operative approach (COAG), although the Federal Environment Minister, Senator Hill, has recently suggested the co-operative approach is now on its last chance.

Problems cross the urban-rural divide, and include:

- Some farmers will be unable to continue farming unless immediate action taken, and massive losses in production could occur;
- Rural communities are experiencing degraded water supplies, and rising water tables and salinity are destroying towns and villages from the ground up, including infrastructure like roads;

- The same problems now evident in outlying suburbs of coastal cities;
- Threat to food and water supply, and quality of drinking water;
- At present rate, Adelaide won't have a reliable supply of drinking water by 2020.

For a copy of the Report, contact the House Environment Committee Secretariat on 02 6277 4580 or visit the House Environment Committee web site: [www.aph.gov.au/house/committee/environ/](http://www.aph.gov.au/house/committee/environ/)

*Alecia Jones, World Wide Fund For Nature Australia*

## NEW IRRIGATED COTTON THREAT TO MACQUARIE MARSHES

A proposal to extend irrigated cotton development on Pillicawarrina, adjacent to the Macquarie Marshes Nature Reserve, was referred late last year to the Environment Protection and Biodiversity Conservation Act for assessment. After a number of submissions from environment groups, including IRN, it was determined that this proposed development is a controlled action under the Wetlands of international importance and Listed migratory species provisions of the EPBC Act.

The following is an excerpt from IRN's submission from December of last year on this proposed development.

The Inland Rivers Network (IRN) considers the proposed extension of irrigated cotton farming on Pillicawarrina to be highly inappropriate. This development should be rejected in principle for the following reasons:

1. The Macquarie Marshes Nature Reserve, which Pillicawarrina is adjacent to, is listed under the Ramsar Convention on Wetlands of International Importance. The proposed development is contrary to the spirit and intent of requirements under the Ramsar Convention with respect to ensuring wise use and management of wetlands without detriment to their ecological character.
2. The proposed development is contrary to the spirit and intent of the Macquarie Land and Water Management Plan.
3. The proposed development is contrary to the application of the precautionary principle in natural resource management.

The following are some particular concerns with the Supplementary Environmental Impact Statement and Management Plan (Sup. EIS & MP) prepared for this proposed development.

**High-flow access and reduced flooding of the Macquarie Marshes**

Reductions in flow have been clearly demonstrated to be the single major factor contributing to wetland loss and degradation in the Murray-Darling Basin. The proposed off-river storage and high-flow licence for Pillicawarrina would potentially dramatically reduce flows into the Macquarie Marshes Nature Reserve. This is even more apparent in view of the position this property occupies, at a major junction for water flow between the southern and northern sections of the Macquarie Marshes Nature Reserve.

**The use of endosulfan**

A major concession allowing the expansion of Pillicawarrina in 1993 was that endosulfan would not be used. Endosulfan deserves special attention due to proven toxicity and ecological persistence. It is openly admitted that approval for use of endosulfan will be actively sought. The use of endosulfan on Pillicawarrina, being as it is in close proximity to Macquarie Marshes Nature Reserve, is totally unacceptable.

**Impact on fauna of the Macquarie Marshes**

The known toxicities of each chemical listed in the Ecological Risk Assessment (ERA) refer only to a few surrogate species tested in the laboratory and cannot be applied directly to the large variety of sizes and physiologies found in the 290 different species of vertebrates that inhabit the Macquarie Marshes. Consequently the analysis estimating the doses required by each species through the various exposure routes (inhalation, contact and ingestion) is fundamentally flawed, and a large number of questionable assumptions have been made, including that animals within the same taxon share similar physiology. Additionally, a simple mortality rate does not include the possibility of producing some other physical damage, impaired reproduction, modified behaviour, or even premature though not immediate death.

Neither does the ERA does not consider the impact of pesticides on juvenile waterbirds, an astonishing oversight considering the acknowledged status of the adjacent Macquarie Marshes as a waterbird breeding area. Juvenile waterbirds are likely to die or be permanently harmed at significantly lower levels of pesticide contamination than that tolerable by adults.

**Impact on flora of the Macquarie Marshes**

The ERA also acknowledges that herbicides, fungicides, defoliants and plant regulators could have a bigger impact on the vegetation of the Marshes than on its fauna, for which the ERA report does not consider the toxicity level. Again this is a serious deficiency as it is the vegetation that not only is the food source in any ecosystem, but equally importantly provides habitat for the remaining trophic levels.

*Craig Woodfield, Inland Rivers Network*

**MEASURING ENVIRONMENTAL FLOWS**

**— A BEAN COUNTER’S VERSION:**

The need for environmental flows has finally been acknowledge by those involved in the management of rivers in New South Wales. Expert scientists, aquatic biologist, ecologists and limnologists have been studying and reporting on the many and varied functions that environmental flows provide for aquatic ecosystems. Despite the wealth of knowledge about the importance of environmental flows, we are still thinking of environmental flows as a sum of ML which need to be added up in the ‘Environmental’ column and subtracted from the ‘consumptive/operational’ total in the river’s accounting balance sheets. Theoretically, we all understand that there is no such thing as ‘surplus’ water in a river system; we know that consumptive water is water taken away from the river’s aquatic ecosystems. And yet, we persist in trying to measure the exact numbers of Megaliters (ML) ‘given’ to the environment in a most inaccurate way. Some would say, it’s the best method we have today and that the modelling will improve as we learn more about the system. I am concerned that we are trying to fit round pegs in square holes. We shouldn’t require the environment to be 100% accountable for all the water it ‘uses’.

For example, despite the fact that the Lachlan’s Environmental Flow Rules (EFR) have been in place for 3 years we are still haggling over how to add up the 350,000ML that Environmental Flow (EFR) Rule 1 can deliver (see box). We are using one of the most sophisticated versions of IQQM (Integrated Quality and Quantity Model). The model accounts for EFR #1 by adding and subtracting the ML of operational water compared to the total sum of water under the EFR hydrograph. I am concerned that this methodology is incorrect and that we have gone beyond the usefulness our IQQM tool.

On the Lachlan River Management Committee we have worked very hard, with the help of the DLWC’s modellers, to come up with environmental flow rules which would deliver environmental benefits. Two out of the three years of current EFR’s have provided unprecedented environmental benefits and we are all very proud of that. However, I do believe, there is something wrong with our society’s current over-dependence on complicated computer modelling programs. On the Water Management Committees we are being asked to provide a huge range of numbers, how many ML used by irrigators, by High Security users, transmission losses... and we are requiring the environment to be accountable for every drop of water it ‘uses’. The concept of

requiring the environment to be accountable for every ML 'received' is flawed in my opinion for at least three reasons:

1. We still do not know how much, when, where or why certain lots of water are used by the environment – for example during a flood, or when water is sent to an end of system wetland.
2. The computer modelling systems treat the 'environment' as just another user, which it is clearly not. For example, the modelling does not account for the positive economic benefits provided to graziers when water is 'lost' in a flooding floodplain.
3. In most cases there are no meters/people in the right places to measure exactly how many ML's were received by the environment (e.g.. At the beginning of a wetland). In the Lachlan's case the measuring point is halfway down the system (Lake Brewster); and many of the targeted wetlands are another 10 river days away (Booligal, Great Cumbung Swamp)! A user would never expect to pay for the MLs released from a storage 10 days away from the property.

Sadly, in this day of 'BAS' and 'BAR' (Base Area Regime) accounting; even the environment, which provides us with such a multitude of 'free' services, can't expect a free lunch. We have to know how many ML are being provided by the EFRs so that we minimise the economic impact of consumptive users using nature's water conduit systems (rivers and groundwater). Out of this prerogative is born a EFR node in the IQQM. One can only hope that the IMEF (Integrated Monitoring of Environmental Flows) program will be able to prove how important the ML's of EFR's have really been. Hopefully Adaptive Management principles will prevail so that amendments to BAR's will be accepted if indeed our EFR's and IQQM's were wrong; even though "...averaged over a hundred years"!

I strongly urge all those busy adding and subtracting ML's of water to remember that the Water Reforms are really about providing boundaries so that our social/economic activities sustain healthy, functioning ecosystems and vice versa. The riverine, wetland and other aquatic ecosystems will survive, recover, or fail wether or not we have added up all the columns of figures correctly or not. However, environmental representatives on Water Management Committees must continue to be vigilant and ensure the environment is not made to be more accountable than the consumptive users are. We have to give the environment a fair go with a fair amount of water.

At the end of the day, if nothing else; the Water Reforms have provided a successful Environmental Education program; bird watchers have learned about the

complexities of IQQM and irrigators have learned about the complexities of the breeding requirements of Broilgas, and now they are talking to each other! In that communication, lies our only hope of saving our precious Australian Inland Aquatic Ecosystems.

#### **Lachlan River Environmental Flow Rule # 1:**

"Translucent releases are to be made from Wyangala Dam during the period 1 June to 31 October to attain, in combination with tributary inflows, flow at Lake Brewster of 3,500 ML per day to a variable upper window (which varies according to storage level to a maximum of 8,000 ML). This is to apply to an upper limit of 350 GL per annum measured at Lake Brewster, including the translucent releases and tributary inflows."

*Sally Hunt, Inland Rivers Network*

## **VICTORIAN RIVER HEALTH STRATEGY**

The Victorian Department of Natural Resources and Environment is coordinating community and scientific input into the development of its River Health Strategy. Meant to provide strategic direction to water reforms and coordination of existing programs and policies, the Strategy will play a key role in rehabilitating Victoria's degraded rivers and streams.

Improving river management is critical: the recently-released Index of Stream Condition found that only 14% of rivers and creeks were in good or excellent condition, whilst a third were in poor or very poor condition. In addition, the lowland riverine fish community in the Victorian section of the Murray-Darling Basin is now listed as a threatened ecological community, with poor management of flows and habitat two of the major degrading impacts.

The Community Reference Panel, which is providing advice to NRE on the development of the Strategy and to the EPA on the development of its *Waters of Victoria* State Environment Protection Policy, is attempting to find consensus on a range of contentious issues, including:

- increasing environmental flow volumes;
- fencing key riparian zones and wetlands;
- mitigating cold water releases from a number of problem storages;
- setting water quality targets;
- the role of catchment groups in setting catchment-based water quality targets; and,
- the relationship between the *Waters of Victoria* and the Strategy.

ACF considers clawing back irrigation allocations to be essential for to providing sufficient volumes of

environmental flows. Bulk Entitlements conducted in the early years of reforms, such as for the Goulburn, need to be reviewed to improve environmental outcomes. The EPA and other government groups with natural resource management responsibilities need to take a stronger role in river management. Victoria also needs to enhance support to non-government groups involved in coordinating community environmental input into river management.

The draft Strategy and *Waters of Victoria* are due out for consultation in May.

*Stuart Blanch, Australian Conservation Foundation*

## THAT DAM ELECTION!

Dams, dams, dams cried the politicians.

The promise of dam development was one of the major commitments coming from both of the major parties during the Queensland election campaign. In an obvious attempt to win votes in a number of what were marginal electorates, both parties committed to more and more dams being built.

### **Dammed if you Do, Dammed if you Don't**

The election saw the Coalition promising to undertake a massive dam building program that would have decimated the rivers of Queensland. This program would have seen 16 new dams built throughout the State at an estimated cost of \$1 billion. This cost did not include the massive costs of trying to mitigate the environmental destruction that these dams would have caused.

The election also saw the politically driven decision by the ALP to support the development of Paradise Dam on the Burnett River. The Queensland Conservation Council (QCC) is absolutely appalled at this decision and believes it was made in direct retaliation to the Coalition's election commitment to build the dam.

Paradise Dam will contain over half the volume of water of Sydney Harbour and will be built in a Basin that is already constrained by over 31 dams and weirs. Paradise Dam will inundate critical habitat of the spectacular lungfish, will drown out endangered forest and will inundate approximately 1000 hectares of prime agricultural land. All studies have indicated that Paradise Dam is neither economically viable nor ecologically sustainable and it is up to us to ensure that it does not proceed.

### **Anti-Dam Alliance to the Rescue**

In an attempt to counter the numerous electoral promises to build dams, dams and more dams, QCC coordinated the formation of a powerful Anti-Dams Alliance. The Alliance, an amalgam of leading conservation, fishing and

surfriding groups, was successfully launched in the week before the election, generating substantial media interest in both Brisbane and regional areas.

In recognition of the need for Queensland to embrace and implement sustainable water management, and of the opportunity to protect and conserve our river systems from further degradation, the Alliance is calling for the protection of wild and natural rivers, native fish stocks, water quality and lasting river health.

The Alliance will be a powerful tool in convincing the Queensland Government to commit:

- to stopping unsustainable and non-viable dam development;
- to implementing sustainable alternative water supply options for Queensland (such as demand management, increasing efficiency of supply, storage and delivery, and water recycling);
- to protecting our remaining wild and natural river systems; and
- to educating the community on the environmentally destructive nature of dams.

### **Protect – Don't Dam**

Dams and irrigation schemes destroy natural water cycles, kill native fish species, create salinity problems, foul water quality which impacts on ecosystems downstream, and cause poisonous blue-green algae outbreaks. Most rely on taxpayer subsidies to build and operate.

A recently released report from the World Commission on Dams (WCD) provides ample evidence that the era of large dam development is over. It clearly shows that the majority of large dam developments are neither economically viable nor environmentally or socially sustainable, especially dams for irrigation. Judy Henderson, a Commissioner with the WCD, commented on the report's recommendations during the Alliance's launch.

The tragic plight of the Murray Darling Basin provides a very good example of the costs of dam development gone too far. Queensland must learn from the mistakes made in other parts of Australia and the world and implement management strategies that actively conserve our water resources so as to guarantee longterm supply of good quality water.

The Anti-Dams Alliance will raise the community's awareness of the longterm economic and environmental impacts of dam developments and will push for alternative water supply sources to be supported in preference to dams, dams and more dams!

**For more information contact**

Kerryn O'Conor, Rivers Project Officer, Queensland  
Conservation Council  
Phone 07 3221 0188 Email: rivers@qccqld.org.au

## **BARWON-DARLING RIVER MANAGEMENT COMMITTEE UPDATE**

The last 6 months have been busy for the members of the Barwon-Darling RMC. Last September the Minister for Land and Water Conservation, Richard Amery, announced that diversions in the Barwon Darling Rivers would finally be capped (5 years after most other valleys were capped in the Murray-Darling Basin) at September 2000 levels of diversions as an interim measure whilst 1993/94 levels of development were determined.

DLWC and Department of Agriculture have undertaken a detailed survey of development history for 1987/88 to 1998/99, which obviously includes 1993/94. DLWC (with input from the Department of Agriculture) are in the process of redoing the IQQM for Barwon Darling incorporating that new data, and making some improvements to the actual model. This process has been signed off by the majority of landholders.

However lack of a reliable cap implementation policy in part led to a subsequent Ministerial embargo on new water supply infrastructure on 22 January 2001. Conditions to be inserted on all licences relate to on-farm storages and supply channels, but not pumps.

If firmly implemented by DLWC the embargo will impose a holding strategy on diversions until the Cap is phased in, and is likely to remain in place for several years at least.

A river health index has been recommended by a joint meeting of the Committee's Planning Working Group and the Water Sub-Committee of the Western Catchment Management Board as the preferred water catchment target for the Western Catchment Management Plan. Rather than rely solely upon a hydrological indicator, the joint meeting thought a group of measures encompassing hydrology, invertebrates, fish, riparian zones and water quality would in time provide the best means of assessing river health. The recommendation was made in full knowledge that adequate data exists for probably only flows at present, but that sufficient data for other aspects of river health exist to provide a qualified assessment of the rivers within the Plan's catchment area. The decision largely was guided by recommendations made by members of the CRC for Freshwater Ecology and the Murray-Darling Basin Commission who gave presentations at the meeting. The proposed Sustainable Rivers Audit of rivers throughout the Basin is based upon a similar assessment of river health, and the RMC's Planning Working Group hopes that the data that will

need to be annually for the SRA will form the basis of the river health index.

In 2001 the RMC will examine medium and high flow sharing options for improving instream variability, and will rely substantially upon commence to fill data collected recently for billabongs, low floodplain and flood-runners.

*Stuart Blanch, Australian Conservation Foundation*

## **MURRAY-LOWER DARLING COMMUNITY REFERENCE COMMITTEE UPDATE**

Releases of the Barmah-Millewa Environmental Water Allocation (EWA) from November to January assisted in the best colonial waterbird breeding event in the Barmah-Millewa redgum forest for 25 years. This is a fantastic outcome for the forest and for the Committee and shows just how much river management has improved in recent years. May the progress continue!

Around ten thousand waterbirds bred successfully, including night herons, ibis, pied and black cormorants. Four species of egrets (great, intermediate, little and cattle) bred as well - the first time in the past quarter of a century. Valued at around \$12 million, the 340, 000 GI released was used to lengthen the tail of natural flooding. In recent years the water level under nesting trees has fallen too rapidly to permit waterbirds to fledge their chicks as increasing volumes of water delivered to irrigators has constrained the volume of water available for the environment.

Modelling of options for the use of the Barmah-Millewa Environmental Water Allocation is currently being considered. The 9 March meeting will determine what trade-offs are made between environmental benefits and impacts upon irrigators. Equity between Victorian and NSW irrigators has been hotly debated in terms of the relative impacts of environmental flows, as has when should irrigators be allowed to borrow EWA water and pay it back.

A working group has also been established to investigate ecological targets and dam release strategies to increase the frequency and duration of flooding of key wetlands, billabongs and anabranches between Hume Dam and Lake Mulwala. The working group is seeking to target environmental releases rather than employ simple translucency releases, and is liaising with the Murray Wetlands Working Group to determine suitable and achievable targets.

What is continually apparent to the Committee is that unless cold water releases from Hume Dam are stopped

the flows will be of little benefit to native fish, and that options for wetting wetlands and floodplains further downstream (such as the Koondrook and Gunbower floodplains, Hattah-Kulkyne wetlands and floodplains downstream of the Darling River junction) must be addressed as a priority.

*Stuart Blanch, Australian Conservation Foundation*



*Redgums in the Barmah-Millewa Forest. Photograph by Stuart Blanch*

## **MACQUARIE CATCHMENT RIVER MANAGEMENT COMMITTEES UPDATE**

Three RMCs are now up and running in the Macquarie Catchment.

The regulated RMC, Macquarie Cudgegong was formed in December 1997. It was given the Macquarie Marshes Management Plan 1996 rules as environmental flow rules. Because these rules focus on the river below Burrendong Dam, the committee has had to look closely at the Cudgegong River reach between Windamere and Burrendong Dams.

The committee has split into three working groups - Water Quality & Salinity, Water Quantity and Flow, Biodiversity and Habitat. The main challenge now, after some preliminary data gathering, is how to cross-reference and communicate connections between these closely linked issues.

The Cudgegong River which flows through the township of Mudgee has experienced a rapid increase in irrigated grape crops. The viticulture industry is one of the most efficient users of water and returns the highest value per megalitre, however, there are some major management problems with the Cudgegong.

In the 1999 LWRDC Occasional Paper 'Cost of Algal Blooms' Windamere Dam tops the list for NSW with algal alerts occurring 87.9% of time between Oct 95 and August 98. These high alerts are still occurring.

Although Windamere has a variable offtake and can, in theory, regulate temperature for downstream habitat, there is a trade off with human & stock health because of high algal blooms at the dam wall.

There is also increasing tension between lower Macquarie irrigators who have always considered Windamere to be a back up for Burrendong and their water requirements, and Cudgegong irrigators who feel their security of supply is compromised when large transfers are released from Windamere to top up Burrendong.

The other issue around these inter dam releases is that they usually occur in Summer, the breeding season for most fauna in the Cudgegong River, including a healthy population of platypus.

Windamere is a large dam for a small catchment and is not refilling as quickly as the pre-dam modelling had projected.

The really major issue for the Cudgegong and indeed the entire Macquarie system is salinity. The geology of the upper catchment has a high natural salt background. The land management practices in these areas have caused a rapid increase in salt mobility which is finding its way into the tributaries and storages. Both Burrendong and Windamere storages are already at a salinity level which could effect sensitive crops. This will limit the consideration of dilution flows to mitigate salt slugs in the future.

The Macquarie Groundwater Management Committee first met in December 1998. The first task was to negotiate a management plan for the lower Macquarie Groundwater area 008 (north-west of Narromine). This area had a history of large irrigators drawing down stock & domestic water supplies. The community had agreed to co-operate to insure that households and stock were not

deprived of water in dry times. The area has been over allocated and one zone is over developed.

This groundwater system is a recharge area for the Great Artesian Basin. The irrigator community has had difficulty in accepting this as a limiting factor to their water usage. There is also debate around the volume of sustainable yield.

The identification of ground water dependent ecosystems has been a challenge for the committee. A joint NCC, Macquarie 2100 application to the Environmental Trust Fund to assist in research in the lower Macquarie has been unsuccessful.

The Committee has a number of other aquifers to write management plans for including the Cudgegong, Bell and Orange basalt areas. There is concern that the OO8 Draft Plan is taking far too long.

The Central West Unregulated Streams Management Committee has had two meetings and three resignations already. The Central West Regional Manager decided to wait till all volumetric conversions had been resolved before calling this committee together. There is a deal of confusion in the community about the role of these RMC's.

All meetings in the Macquarie scheduled for early March have been postponed because the definition of the Bulk Access Regime (BAR) is still being formulated. The tight time frame appearing in the new Water Management Act 2000 for setting the BAR in each catchment is causing concern and confusion in these committees.

Adding to the challenge of developing individual water management plans and fitting them together is the introduction of the Catchment Management Board process. A very tight time frame with specific management targets is threatening to overrun the work already done by RMC's especially on water quality issues.

It is hoped that all these planning processes will finally link together. However, it seems that different individuals with different levels of knowledge and different agendas are sitting on different committees making decisions about the same things.

There is a potential for good environmental outcomes to fall through the widening cracks of this plethora of planning.

*Bev Smiles, NCC representative*



*Macquarie Marshes in Flood. Photograph by MDBC.*

# THREATENED FRESHWATER BIODIVERSITY

## THREATENED FRESHWATER SPECIES IN NSW

### New Species Listings

The ever-increasing list of endangered freshwater species in NSW now has three new additions, with the Murray Hardyhead *Craterocephalus fluviatilis* and the River Snail *Notopala sublineata* listed as endangered, while Buchanans Fairy Shrimp *Branchinella buchananensis* has been listed as vulnerable.

### Proposed Endangered population

The western population of the Purple spotted Gudgeon *Mogurnda adspersa* has been proposed as an endangered population. This population encompasses the entire Murray Darling Basin, and there is some evidence to suggest it may be genetically distinct from the eastern (or coastal) population. The NSW Fisheries Scientific Committee has found that the causes of the decline in the western population of *Mogurnda adspersa* may include:

- Predation by introduced fish such as Gambusia and Redfin perch.
- Habitat loss.
- Rapid fluctuations in water levels (due to water regulation) that have deleterious effects on successful reproduction and recruitment.

### Proposed Endangered Ecological Community

The NSW Fisheries Scientific Committee is proposing to list the Aquatic Community of the Lower Murray River Drainage (including the regulated portions of the Murray River below the Hume Weir, the Murrumbidgee River below Burrinjuck Dam, and the Tumut River below Blowering Dam) as an Endangered Ecological Community.

This community is characterised by species such as Murray Cod *Maccullochella peeli peeli*, Southern Pygmy Perch *Nannoperca australis*, and Murray Cray *Euastacus armatus*, and includes over 20 vertebrate and 400 invertebrate species

The threatening processes specifically mentioned in the proposal include:

- Regulation of the system by numerous dams and weirs which has reversed the seasonal flow regime and has stopped migrations upriver because passageways over or around the barriers are few.
- The release of cold water from the bottom of dams and weirs.

- The presence of introduced species.
- The clearing of riparian vegetation from the banks, and the removal of logs and snags from the river bottom.
- Clearing of floodplain vegetation for agriculture.
- The reduction of river flow by irrigation.
- Pollution through insecticide and fertilizer runoff.
- Salinisation of inland waters, exacerbated by both forest clearing and irrigation.
- Overfishing.

Submissions have been called for and are due by Friday 16<sup>th</sup> March 2001. For more information, visit [www.fsc.nsw.gov.au](http://www.fsc.nsw.gov.au) or contact IRN.

*Craig Woodfield, Inland Rivers Network*

## THREATENING PROCESSES FOR FISH IN NSW

There are currently 7 threatened fish species in NSW, and one proposed threatened fish population. A number of these species share probable causes in decline, as determined by the NSW Fisheries Scientific Committee. Three of these are listed below, with explanations of how they impact on native species, and what action is being taken to remedy these problems.

(Note that Eastern Freshwater Cod, Trout Cod and Oxleyan Pygmy Perch were not considered by the NSW Fisheries Scientific Committee, as they were adopted directly from the Commonwealth threatened species list when NSW legislation was changed in 1997. It is reasonable to assume, however, that at least some of the listed processes impact upon these three species.)

### 1. Introduced Species

What it means:

There are 6 species of introduced freshwater fish that have been recorded in NSW waters in recent years: carp, goldfish, redfin perch, brown trout, rainbow trout, and mosquito fish. These species often benefit from river modification (such as dams, thermal pollution, weir pools etc.) and compete with, and prey upon, many native fish species.

Species affected:

Murray Hardyhead, Silver Perch, Macquarie Perch, Southern Pygmy Perch, Purple Spotted Gudgeon (western population - proposed), Aquatic Community of the Lower Murray River Drainage (proposed).

Action so far:

NSW Fisheries stocks and actively encourages the stocking of millions of introduced brown and rainbow

trout into NSW waters every year. Attempts to eradicate species such as carp are virtually pointless while other river management issues are not dealt with, as carp thrive in modified environments.

## 2. Thermal pollution

What it means:

Water stored in dams undergoes a stratification process, due to limited light penetration. Sunlit surface water forms a warmer and less dense layer over a cold, denser layer. Since most dams are only equipped with bottom-release valves, the released water can have a temperature of up to 15 degrees below the natural temperature, and persist for hundreds of kilometres downstream. This can have a serious effect on native fish species, particularly in summer, causing them to abort breeding activity or even killing eggs or fry.

Species affected: Macquarie Perch, Silver Perch, Murray Hardyhead, Southern Pygmy Perch, Aquatic Community of the Lower Murray River Drainage (proposed).

Action so far:

There have been a number of studies conducted on the effects of thermal pollution and the costs of mitigating works on major dams such as Burrendong and Hume. However, there have been no dedicated funds assigned for thermal pollution mitigation, and this appears unlikely to change in the near future. IRN and WWF will be hosting a thermal pollution workshop later this year (see page XX).

## 3. River Regulation

What it means:

The construction of thousands of dams, weirs and floodgates throughout NSW has had a serious effect on many native species. Fish are quite often only able to move over such barriers during periods of high flood, and then may be unable to return to the river when floodwaters subside.

Species affected: Macquarie Perch, Silver Perch, Murray Hardyhead, Aquatic Community of the Lower Murray River Drainage (proposed).

Action so far: The NSW State Weir Review Committee has yet to receive any significant funding to conduct weir removal or modification programs. This appears unlikely to change in the near future. NSW Fisheries Fishways program receives sufficient funding to build just one small to average sized fishway (which allow native fish to bypass river barriers) per year.

## Conclusion

These three threatening processes are serious enough on their own, but when combined pose a significant threat to the ecology of the Murray-Darling Basin. Despite this threat, there has been an almost total lack of funding for

programs to address these issues. Additionally, NSW Fisheries actually compounds the problem by spending public money stocking introduced species that are known to impact upon threatened native species. The NSW Government cannot claim to be serious about protecting freshwater biodiversity until these issues are given the funding and resources that they deserve.

*Craig Woodfield, Inland Rivers Network*

## THREATENED FRESHWATER SPECIES IN VICTORIA

Late last year the Victorian Scientific Advisory Committee made a preliminary recommendation to list the following invertebrate taxa as threatened under the Victorian Flora and Fauna Guarantee Act 1988.

Glenelg Freshwater Mussel *Hyridella glenelgensis*  
Western Swamp Cray *Gramastacus insolitus*  
South Gippsland Spiny Cray *Euastacus neodiversus*

The Glenelg Freshwater Mussel is the first freshwater mussel to be recommended for listing in Victoria. Additionally, the Lowland Riverine Fish Community of the southern Murray-Darling Basin has now been listed as a threatened community.

A decision on the following species was deferred pending further information gathering.

River snail *Notopala sublineata*  
Otway Black Snail *Victaphanta compacta*  
Murray Spiny Cray *Euastacus armatus*  
Glenelg Spiny Cray *Euastacus bispinosus*

*Craig Woodfield, Inland Rivers Network*

## WILLOWS SHOWN TO IMPACT ON FRESHWATER FAUNA

The widespread distribution of willow trees (*Salix fragilis*) has long been thought to impact deleteriously on in-stream faunas in south-eastern Australian rivers. A recently completed thesis entitled 'Comparison of the in-stream fauna and resources of Tasmanian river reaches lined with willows or with other riparian types' by Martin Read at the University of Tasmania has now conclusively demonstrated this.

This research had three main components. Firstly, a survey was used to compare willow vegetation to native riparian vegetation and associated impacts on macroinvertebrate populations. Secondly, the same approach was used to examine differences in macroinvertebrate and fish populations between willowed

vegetation and reaches where willows have been removed. Finally, the role of willow large woody debris (LWD) was investigated via a comparison of in-stream native wood to willow wood and the associated effects on macroinvertebrate and fish populations.

The principal effects of willow vegetation on the biota occurred in summer and were due to a combination of shading effects and decreased water quality and alterations to channel morphology in willowed reaches. While reaches in native riparian zones supported higher densities and numbers of taxa, these were significantly lower in willowed reaches.

Comparisons between willowed reaches and reaches where willows had been removed revealed major differences in resources derived from riparian vegetation. Willowed reaches had high organic matter standing stocks and usually low epilithic growth on the substrate. In contrast, removal reaches had lower organic matter standing stocks and higher epilithic biomass.

Willow LWD is not common in rivers in Tasmania and is a poor ecological substitute for the more complex native debris, which supported higher densities and richness of macroinvertebrate taxa than willow wood; however, both wood types supported similar community composition. LWD provided important habitat for the fish populations surveyed and reduced or negligible standing stocks of LWD corresponded to a reduction in the number and size of particular fish species.

The findings confirm some of the speculations regarding the impact of willows on rivers in south-eastern Australia. Willows were found to be a poor surrogate for native vegetation although they provided important riparian resources in the absence of any vegetation at all. The restoration of riparian zones and selective and strategic removal of willowed vegetation over the long term and replacement with endemic vegetation should minimise the ecological impacts of riparian vegetation removal on macroinvertebrates and fish.



*Willows on the upper Murray. Photograph by Stuart Blanch*

## **WATER REGIME OF WETLAND AND FLOODPLAIN PLANTS IN MURRAY-DARLING BASIN: A SOURCE BOOK OF ECOLOGICAL KNOWLEDGE**

Jane Roberts and Frances Marston, CSIRO Land and Water, October 2000.

This excellent document provides a summary of water regime information for native plants of lowland riverine systems within the Murray Darling Basin. This information is needed when planning river flows or when making water allocations, particularly in relation to individual floodplains, single billabongs and large floodplain wetland complexes. An essential resource for individuals or organisations involved in ecological aspects of river flow or wetland management.

For a copy of this report contact CSIRO Land and Water on 02 6246 5700 or email [communication@clw.csiro.au](mailto:communication@clw.csiro.au)

*Craig Woodfield, Inland Rivers Network*

# INTERNATIONAL NEWS

## WORLD COMMISSION ON DAMS

The final Report of the World Commission on Dams (WCD) was launched by Nelson Mandela late last year. Key recommendations focus on improved public participation, in-depth mandatory environmental impact assessment, and a review of all existing large dams. The Report is the culmination of 2½ years of hard work, extensive debate and wide consultation leading to identification of the need for dam projects to sustain rivers and livelihoods, and for greater efficiency and accountability.

The WCD was established by the World Bank and the World Conservation Union (IUCN) to independently review the development effectiveness of large dams, to assess alternatives and propose practical guidelines for future decisions. It arose out of an IUCN-World Bank workshop held in response to a global tide of concern over the adverse social and environmental impacts of large-scale dams around the world. James Wolfensen, President of the World Bank, is to present the findings to the bank's 180 member nations in February, leading to a decision on whether to implement them. The twelve-member Commission represented a diverse range of interests. Among them were two Australians – Mr Don Blackmore, Chief Executive Officer of the Murray Darling Basin Commission, and Dr Judy Henderson, former Chair of Oxfam International and member of the NSW Environment Protection Authority Board. The work of the Commission was assisted by a forum drawn from 68 institutions in 36 countries and teams of researchers, as well as major consultations and many submissions, providing an important legacy of documented evidence and proposals for change.

### Why is all this relevant to us?

NPA was a founding member of the Inland Rivers Network (IRN) back in 1961, and has long been an advocate for better management of our river systems to address their declining health. NPA, along with other environment groups, signed on to a major submission to the WCD prepared by Jacquie Svenson for the Nature Conservation Council, focusing on ecosystem function and environmental restoration. Approached for comment on the relevance of WCD recommendations to Australia, Dr Judy Henderson has highlighted a number of key issues.

### Stakeholder involvement

In recent decades dam building has not been a major development activity in Australia, but those projects

which have been considered have tended to incur controversy, with opposition from both environmental and indigenous groups. Part of the problem is that there has been little public participation at the time of analysis of the development needs of a region. The WCD recommends that stakeholder involvement should occur much earlier in the process than has been the custom here, with agreement being sought on the needs for energy and water resource development. This should be followed by a further transparent and inclusive process in the selection of appropriate alternatives to meet these needs, with the minimum of social and environmental impact. Strategic impact assessments of alternatives should also have stakeholder involvement and gain public acceptance. If the site of a proposal involves Aboriginal country, the WCD recommends that the prior informed consent of the indigenous people should be obtained.

### Addressing existing dams

In the global review of large dams, the WCD found that in many cases existing dams were under-performing with very little ongoing evaluation and adaptive management of these structures. WCD recommends that existing facilities should be optimised, including giving attention to resolution of outstanding environmental issues. A recent NCC/IRN media release stressed that in confirming the massive environmental, economic and social destruction from dam development, the WCD findings have implications for dam management and associated river regulation throughout NSW and beyond. With 30 large dams in the Murray-Darling Basin alone, flow regulation and cold water releases – which affect 3,000 km of river length – many native fish are close to extinction and wetlands seriously depleted. The Total Asset Management Plan, currently under way in NSW, provides an important opportunity to review not only safety but also ecological impact. One option is to de-commission non-performing dams. Here the USA has led the way, finding that the economic savings and environmental benefits more than offset the costs of maintenance and management. Papers documenting some of these approaches were included in the recent Inland Rivers Network Conference The Way Forward on Weirs.

### Responsibility of Australian companies operating overseas

Dr Henderson points out that as dam building has decreased in Australia, many local construction companies and consulting firms have moved off-shore in search of new projects, particularly in South East Asia. The WCD calls on all companies to implement WCD criteria and guidelines in all areas of their operations. Australian companies should publicise acceptance of

WCD recommendations in their corporate policies, and should develop management systems and certification procedures, for example ISO 14001, to ensure – and demonstrate – compliance with the WCD guidelines. The WCD found that allegations of corruption surround many large dam projects but have seldom resulted in prosecution. Australian companies should follow the WCD recommendation of adopting Integrity Pacts on a project-specific basis. An Integrity Pact is a voluntary undertaking that sets out the contractual rights and obligations of all parties to a procurement contract and thus eliminates uncertainties.

### **Funding agencies worldwide**

The International Rivers Network, which has taken a lead role in advocating the need for change, contributed actively in the formation of the WCD. They responded – along with other groups around the world – on the release of the final WCD Report by calling for a moratorium on further dam building until the Commission's recommendations are fully implemented. They noted that the WCD report vindicates many concerns raised by NGO campaigns, referring specifically to controversial projects such as India's Narmada River dams, the Ilisu Dam in Turkey, Pak Mun in Thailand, Nam Theun 2 in Laos, and San Roque in the Philippines. The World Bank and export credit agencies in particular are urged to pay heed to these recommendations.

### **Responsibility of AusAID**

The Australian Government has a specific opportunity through AusAID and through its influence in the Asian Development Bank to review policies and internal processes in light of the report. These agencies as a matter of priority should assist developing countries in the region to implement the WCD recommendations. This is particularly relevant for countries along the Mekong River with significant existing or potential dam-affected populations. AusAID and the ADB should review projects they have been involved with to identify those having unresolved social and environmental issues, and assist countries to address outstanding compensation issues.

### **International responses to date**

Encouragingly, WCD work is already leading some to rethink project support. Skanska AB have announced their intention to apply the guidelines for major hydropower projects. In Norway, Prime Minister Jens Stoltenberg has said there would be no more large-scale hydropower developments. New York-based Ogden Corporation have withdrawn from the controversial Maheshwar Dam on India's Narmada River. The company had decided to quit the dam due to "growing concerns on project economics" so Mr Kent Burton, Ogden's Vice President for Policy and Communications, informed the International Rivers Network. The Narmada River suite of 30 major and 3,000 smaller dams

would displace some 200,000 people and affect the livelihood and land of many more. The acceptability of hydro-power as a 'green' and renewable energy source has also come under challenge due to the adverse impacts of the dams. One newly recognised issue is the release of greenhouse gases from rotting vegetation in dams and weirs. This has led the International Association of Theoretical and Applied Limnology (Societas Internationalis Limnologia) to organise a session on Reservoirs and Greenhouse Gases in Melbourne in February .

The Commission has now disbanded, with implementation of their many recommendations passing to governments, funding institutions and dam builders around the world. Experience shows that success will largely depend on non-government groups keeping up the pressure on bureaucrats and decision makers around the globe to take up the challenge.

The author thanks Dr Henderson for her help with this article.

*Anne Reeves, National Parks Association of NSW*

"Dams & Development" WCD Final Report can be ordered from the publisher Earthscan in London, via [earthinfo@earthscan.co.uk](mailto:earthinfo@earthscan.co.uk).

# CONFERENCES AND WORKSHOPS

## TECHNICAL WORKSHOP ON COLD WATER POLLUTION

Lake Hume, Albury, May or June 2001

Cold water pollution is caused by the release of water from the base of impoundments to meet downstream agricultural, industrial and domestic demand. Available evidence suggests that it has a profound adverse impact upon native warmwater fish communities both directly and indirectly. For instance the construction of Dartmouth Dam caused the elimination of 3 species of native fish and their replacement by the alien species Brown Trout.

It has been estimated that the length of river affected by cold water pollution in the NSW section of the Murray-Darling Basin is 2670 km. Victoria has listed it as a key threatening process under its *Flora and Fauna Guarantee Act 1988*, with NSW looking at following suit. An awareness and acknowledgement of cold water pollution in Queensland, South Australia and the ACT is more recent.

Historically, variable-level offtakes were considered to be the only viable option to mitigate thermal pollution, but initial costings were put at \$5-20 million/dam. However recent studies by CSIRO Land and Water have found alternatives that may be as little as 10-20% of these earlier estimates.

The workshop will contribute towards the implementation of the Murray-Darling Basin Native Fish Management Strategy and is being supported by the Murray-Darling Basin Commission and various river management agencies.

### Purpose

- To provide a forum for enhancing progress towards mitigating thermal pollution from dams in the Murray-Darling Basin.
- Summarise impacts, mitigation issues and operational issues.
- Outline knowledge gaps, cost, benefits and spending priorities.

**For more information, contact Greg Williams at IRN.**



## ***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.**

This edition of IRN NEWS was edited and produced by Craig Woodfield.



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