

**Audit Report on Draft  
Condamine-Balonne Water Resource Plan**

**Independent Audit Group**

**13 February 2004**

## **1. Introduction**

The Murray-Darling Basin Ministerial Council at its June 1995 meeting decided to introduce a Cap on diversion of water from the Murray-Darling Basin. A Cap on the volume of diversions associated with the 1993/1994 level of development was seen as an essential first step in establishing management systems to achieve healthy rivers and sustainable consumptive uses.

The Queensland Government argued that, on equity grounds, the 1993/1994 levels of development would substantially constrain development. Council agreed that for Queensland any final agreement would need to await the development of Water Resource Plans (WRP), the outcome of which was to be subject to consideration by Council.

Council also agreed that the Water Resource Planning process should ensure that Queensland balances consumptive and in-stream use.

The IAG in its 1996 report in supporting the Water Resource Planning process advised Council that the process should include the following features :-

- it must accommodate in-stream use not only in Queensland but also in the Border Rivers under the control of the Border Rivers Commission and the rest of the Murray-Darling Basin;
- a management regime needs to be developed that includes pricing, property rights, and measuring and reporting;
- the WRP be fully implemented, including assessment of downstream impacts in New South Wales;
- the Precautionary Principle be applied through the establishment of an allocation to be held in reserve to minimise the risk of over allocation for consumptive use; and
- a final independent audit be conducted of the Water Resource Planning process including modelling of impacts on downstream Basin flows.

For unregulated rivers in Queensland with high seasonal variability, Council agreed that the Cap could be described on the basis of end of valley flows and supporting flow management rules

including diversion entitlements. This was to be a transitional arrangement with the Cap to be specified as diversion limits on a valley-by-valley basis after December 2002.

A draft Water Allocation and Management Plan (WAMP) was published in 2000<sup>1</sup>. This was based on extensive studies covering economic, social and environmental issues, and sought to balance economic and social outcomes with protection of environmental values particularly those in the Lower Balonne, Culgoa floodplain, and the Narran Lakes.

The community, particularly the Lower Balonne community, was concerned by the proposals in the draft Plan including the scientific basis underpinning the conclusions. As a consequence the Queensland Government in 2002 initiated an independent scientific review of the science underpinning the assessment of the ecological condition of the Lower Balonne and established revised community consultation processes to develop scenarios that could achieve a balance between consumptive use and environmental outcomes.

The outcome of these deliberations resulted in the Queensland Government releasing a revised draft WRP for the Condamine-Balonne in December 2003.

The Independent Audit Group was asked to audit the draft Plan in terms of the directions previously agreed to by the Ministerial Council.

This is the report of the Audit.

## **2. Audit Process**

In view of the previous audit of the 2000 draft Plan, the Independent Audit Group focussed on a limited number of key issues. These included :-

- impact on downstream flows (below the Queensland border);
- capacity of the proposed plan to achieve a balance between diversions and environmental outcomes;
- protection of nationally and internationally recognised environmental values; and
- capacity of the proposed plan to produce measurable and auditable criteria to ensure Cap compliance.

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<sup>1</sup> The WAMP process has been superseded by the WRP process prescribed under the *Water Act 2000*

The process adopted by the Independent Audit Group to review the 2003 draft WRP was to –

- undertake a desktop review of the ‘Overview Report and Draft Plan - Condamine and Balonne Draft Water Resource Plan and Supporting Documents’ (see references);
- identify issues and additional information required by the Independent Audit Group to enable it to reach a view on the efficacy of the draft plan;
- undertake a face to face meeting and briefing with officers of the Department of National Resources and Mines, and representatives of the lower Balonne Community Reference Group on 13 February 2004;
- preparation of a draft report copies of which were provided to officers of the Department of Natural Resources and Mines for comment; and
- finalisation of the report to reflect the views of the IAG.

### **3. Draft Condamine and Balonne Water Resource Plan**

The key elements of the draft plan include:-

- an event-based environmental flow management approach;
- in the Lower Balonne, reduced daily flow extraction by 10% for up to ten days for specified flow events in order to provide flow outcomes for the biota of the rivers and distributary channels of the Lower Balonne and their associated wetlands, the Narran Lakes, the National Parks of the Culgoa floodplain and the Darling River;
- increased access during large, less environmentally important, flow events to compensate for reductions; and
- continuation of existing moratorium on new works that would increase water diversions including overland flow.

Other features of the plan include:-

- existing water licences will be converted to tradeable volumetric water allocations. In the conversion process there will be a reduction for existing entitlement holders to accommodate the activation of sleepers;
- regulation of overland flows including licensing of the taking of overland flow water in the Lower Balonne;
- development of a Resource Operations Plan which will provide the statutory basis for the management rules; and
- monitoring, assessment and reporting.

The bottom line is that the draft WRP effectively sets diversions at the September 2000 moratorium level of infrastructure development with relatively minor adjustments through flow event management.

This audit examined the draft WRP in terms of “compliance” with best practice identified in the IAG’s 1996 report. This includes comments on the WRP process, impact on downstream flows, balance between consumptive diversions and in stream use; application of the precautionary principle, operating rules and a measurement, monitoring, reporting and auditing framework.

#### **4. Water Resource Planning Process**

Following the Murray-Darling Basin Ministerial Council 1995 decision to introduce a Cap, Queensland commenced an extensive process of technical assessments and community consultations towards the finalisation of a Water Allocation and Management Plan (WAMP) for the Condamine-Balonne river system.

The IAG acknowledged and supported the WAMP process and recommended to Council that inter alia this process should incorporate a final independent audit of the WAMP process, including modelling of impacts on downstream basin flows.

The WAMP process undertaken by Queensland incorporated the development of a daily flow hydrologic model and assessment of the ecological condition of the Condamine-Balonne

catchment streams. A Community Reference Panel was established and technical Advisory Panels commissioned to examine and report on specific issues relating to the health and sustainable development of the catchment.

A draft WAMP for the Condamine-Balonne Basin was released in June 2000 and submissions invited on that Plan. The IAG prepared and submitted an audit report on the Plan as previously agreed by the Council. Extensive concerns expressed on aspects of the draft Plan necessitated a review of the technical information that formed the basis of the Plan, and the decision to prepare a new Water Resource Plan.

Ministerial Advisory Committees were established for the upper and middle parts of the Condamine-Balonne Basin to facilitate community consultation in this process. The Lower Balonne Community Reference Group provided stakeholder input from the bottom end of the catchment.

To address concerns regarding the technical foundations of the draft WAMP, a Scientific Review Panel headed by Professor Peter Cullen was commissioned to examine and report on the science underpinning the assessment of the current and future ecological condition of the Lower Balonne (the Cullen Report). The Cullen Report was presented in early 2003. The term of the Lower Balonne Community Reference Group was extended for a further period to assist the Department of Natural Resources and Mines (NR&M) to implement the Cullen Report's findings in response to a government commitment for this next step.

Membership of the Lower Balonne Community Reference Group was extended to include representation from a wider group of users from the Lower Balonne (including users from across the border in NSW). Advice was obtained from this Group and from the Middle and Upper Condamine Ministerial Advisory Committees on the possible content of a new draft Water Resources Plan. Professor Cullen and his team were asked to review the Lower Balonne Community Reference Group's proposals as part of this process.

The proposals from the three community reference groups and the comments of Professor Cullen, and the Scientific Review Panel formed the basis of the preparation of the new draft Water Resources Plan by NR&M. This new draft Plan was published in December 2003, and interested stakeholders asked to make submissions by early February 2004. This was subsequently extended to 19 March 2004.

The process that has been undertaken since 1996 when the first steps towards the development of a WAMP were taken, has involved extensive community consultation and interaction combined with technical assistance and advice from various scientific cultural, economic and environmental specialists. The process has involved opportunities for wider community input and discussion of the various drafts of the Plan and has provided the basis for informed consideration of the options available to Queensland. Included in this consultative process has been participation by cross border users of the river and opportunity for input from relevant NSW authorities.

### **IAG Conclusion**

The process has been hampered in some places by the paucity of data and reliable information on some matters particularly environmental values, objectives and criteria. These difficulties are in part reflected in the limited analysis that has been undertaken of the likely downstream impact of the draft Plan notwithstanding the input of Professor Cullen and the Scientific Review Panel. The draft Plan has sought to overcome some of these difficulties by providing for a review after five years of operation. Also, it is noted that corrective action could be taken even before this scheduled five year review under the periodic reporting and review mechanisms provided for under the *Water Act 2000*.

## **5. Downstream Impacts**

No outflow (from Queensland) data is quoted in the Water Resources Plan but this was made available to the IAG during the audit of the WRP to enable estimation of the downstream impacts of the proposals in the WRP. The information on median and mean flows (Table 1) indicates significant impacts of development under moratorium conditions compared to those under predevelopment conditions. The mean flow at the border is 50% while the median flow is 26% of pre-development flows.

No current data is available on downstream impacts south of the border. However, Prasad and Close (2000) estimated mean annual flow impacts and by applying the relevant conversion factors, the impact can be estimated for the moratorium conditions (Table 2)

**Table 1 – Impact on Development on Flows in Condamine-Balonne System**

Location	Predevelopment Conditions Mean Flow (GL/year)	Moratorium Conditions Mean Flow (GL/year)	Moratorium as a % of Predevelopment	Predevelopment Conditions Median Flow (GL/year)	Moratorium Conditions Median Flow (GL/year)	Moratorium Median as a % of Predevelopment
<b>Balonne River at St George</b>	<b>1376</b>	<b>1026</b>	<b>75%</b>	<b>955</b>	<b>582</b>	<b>61%</b>
Narran River at Border	214	105	49%	165	55	34%
Briarie Creek at Border	90	54	60%	37	2	4%
Culgoa River at Border	792	372	47%	539	116	22%
Bokhara River at Border	58	45	78%	38	25	67%
Ballandool River at Border	63	34	55%	31	14	46%
<b>Total Flow at Border</b>	<b>1218</b>	<b>610</b>	<b>50%</b>	<b>832</b>	<b>218</b>	<b>26%</b>
<b>Inflows to Narran Lakes</b>	<b>185</b>	<b>89</b>	<b>48%</b>	<b>137</b>	<b>42</b>	<b>31%</b>
Bokhara River End of System	53	32	61%	30	10	33%
Culgoa River End System	498	239	48%	373	121	32%
Narran Lakes Overflow	58	38	66%	2	0	0%
<b>Total End of System Flow</b>	<b>609</b>	<b>310</b>	<b>51%</b>	<b>408</b>	<b>130</b>	<b>32%</b>

**Table 2: Estimated Reduction in Mean Annual Flow as a Consequence of Moratorium Level Development in the Condamine-Balonne (GL/Year)**

<b>Flow Component</b>	<b>Reduction in Flow (GL/year)</b>
Outflow from Queensland	608
Darling River at Burke	540
Inflow to Menindee	459
Darling River at Burtundy	248
Flow to South Australia	231
Flow over Barrage	237

The current proposal allows for the Cap to be set through an event based management system with levels of diversions somewhat less than the September 2000 moratorium levels of diversions. As a consequence, the estimates in Table 2 are likely to be marginally higher than would occur with the WRP and ROP in place. The IAG notes that the actual downstream impacts of the WRP proposal can only be worked out when the specific individual management rules are factored in.

### **IAG Conclusion**

The moratorium levels of development results in an estimated mean annual reduction in flows at the border of 608 GL/year compared to predevelopment flows. There are also substantial indicative reductions in flows downstream of the Border.

The proposed flow event management system is designed to ameliorate the ecological impacts immediately downstream, but is unlikely to have significant impacts further downstream. However, because of the constraints that the Plan places on the resources that may be used in these events and the provision for payback at a time of higher flow, compared to current conditions, event-based flow management is unlikely to increase, significantly the mean annual flow.

## **6. Consumptive Use Versus In-stream Use**

The IAG's audit of the original draft WAMP in 2000 identified that in the IAG's view, based on the then known information, the Plan did not provide adequate water to protect instream and downstream ecological processes particularly the Narran Ramsar wetlands. Following

community concerns over the science underpinning the 2000 draft WAMP, the Queensland Government commissioned an independent Scientific Review Panel in July 2002 which reported in January 2003.

The report based on the then understanding of the hydrology of the system identified:-

- Four important ecological assets in the Lower Balonne that need to be managed including—
  - (a) the biota of the rivers and distributary channels of the Lower Balonne and their associated wetlands;
  - (b) the internationally recognised Narran Lakes;
  - (c) the National Parks of the Culgoa floodplain; and
  - (d) the Darling River itself.
- The rivers and wetlands of the Lower Balonne system are presently in a reasonable ecological condition, but this condition is expected to deteriorate if the present capacity to extract water from the system should actually be exercised.
- That management targets expressed as a function of mean annual flow are inappropriate for the Lower Balonne. The Panel advocated an event based management approach.
- Use of the current infrastructure to its full potential will result in the removal of small floods and reduce medium floods to small floods. Larger floods were not expected to have much impact.
- That reduced flooding frequency would lead to further changes in the vegetation of the Lower Balonne floodplains. This includes putting at risk vegetation in two National Parks.
- That it is possible to reduce these impacts to acceptable levels by careful management of floods that ensures the various wetlands including Narran Lakes and the Culgoa National Parks receive appropriate wetting.
- In relation to the Narran Lakes the Panel advised that -

*“Narran Lakes would be expected to fill on average once in about seven years rather than once every two under pre development conditions and that this would lead to significant long term degradation of the Narran Lakes and*

*An interim finding by the Review Panel..... is that Narran Lakes need to be flooded on average once every 3.5 years if its ecological values are to be maintained.”*

In effect the Independent Scientific Review Panel did not support the Department’s submissions relating to the existing ecological condition of the Lower Balonne.

The Lower Balonne Community Reference Group, in response to the report of the Independent Scientific Review Panel and additional information, developed a proposal as input to the draft WRP. This proposal forms the basis of the draft WRP for the Lower Balonne. A draft of the proposal was also referred by the Lower Balonne Community Reference Group to the Independent Scientific Review Panel for comment. The comments (Cullen et al) in part include:-

- The Ramsar wetland area is believed to be the primary bird breeding area, and both the Ramsar wetland and the Narran Lakes provide good feeding areas for ducks and ibis.
- Even at 50% full enough area may be flooded to enable invertebrate populations at least to hatch and develop sizeable populations that birds can feed on. The environmental cues that trigger fish breeding and growth in these temporary water bodies are not well known and it is not possible to say at this stage whether a partially filled lake creates useful habitat for fish. The current Narran project (at the CRC for Freshwater Ecology) should provide some information about this question.
- Water birds will only initiate breeding around Narran Lake and the Ramsar wetlands when the lignum and red gum vegetation are themselves inundated. Thus if the water bodies are not completely inundated it is unlikely that breeding will occur even if suitable feeding areas are present.
- The presence of other nearby breeding habitat, e.g. Macquarie Marshes, Gwydir wetlands, may well influence whether birds actually breed in the Narran region. If other habitats get inundated before the Narran area then breeding will start in (and may be restricted to) these other regions. A partially filled Narran Lake and Ramsar wetlands should encourage feeding in the Narran area but the birds will probably move elsewhere to breed (assuming water is present) if water levels at Narran do not inundate the lignum and red gums. Thus breeding at Narran is likely to be somewhat dependent on the interaction of the flooding patterns of these

wetlands with those of other wetlands nearby. Such complexity is always going to make prediction of breeding in the Narran area difficult.

- As the present situation is understood, the Ramsar wetland will wet at a near natural frequency (16% of the time compared to a natural regime of 22%), even though the larger Narran Lake will fill much less frequently than under natural conditions (5.5% of the time compared to the natural of 13%).
- The issue then is that bird-breeding events are likely to be initiated with an almost natural frequency but there may not be sufficient feeding area to allow the birds to develop and mature.
- Given current understanding of alternative feeding areas, the Independent Scientific Review panel believes it is likely the birds will be able to feed under this regime, and so the Panel believes the wetting regime proposed is a reasonable interim solution until further information is available from the Narran Lakes project (IAG emphasis).
- This watering strategy seems appropriate to provide protection for the Narran Lakes until further information becomes available. The panel has not seen the modelling showing its impact on the Culgoa floodplain wetting, and the relevant agencies still need to specify appropriate wetting regimes to protect these other ecological assets. The report does not specifically consider the impacts on the Darling River or the channels of the LB floodplain but the Panel believes they will be advantaged by the proposed regime.

Effectively the draft WRP restricts water use including overland flow take at the year 2000 levels of development with flow regimes modified under low and medium flows to provide flow through events to the Culgoa Floodplain, Narran Lakes and Darling River in an endeavour to improve environmental outcomes.

The draft Plan provides for Lower Balonne water harvesters to be restricted to 90% of their diversion rate for either 5 or 10 days during specific flow events to provide additional flow to meet environmental objectives.

Assuming a maximum rate of diversion of about 30,000 ML/d, this would correspond to a maximum total volume of 15 GL over 5 days or 30 GL over 10 days. Because not all of the

water harvesting is upstream of Narran Lakes, not all of this water is available to top up these lakes. Because of the bifurcations of the streams and the location of water harvesting, the maximum volume of water available per event to improve the flooding of these lakes is between 5 and 15 GL. By comparison the capacity of the Ramsar wetlands is 1.8 GL and that of the main Narran Lake is 105 GL.

### **IAG Conclusion**

While there is limited scientific basis at this time to identify appropriate flow regimes in terms of quantity and timing to meet specified ecological outcome criteria, the IAG notes that the Scientific Review Panel believes that the wetting regime proposed is a reasonable interim solution until further information is available from the Narran Lake project.

## **7. Precautionary Principle**

The draft WRP, in the view of the IAG, endeavours to maintain current economic and social outcomes without adequately addressing environmental outcomes.

The Independent Scientific Review Panel found that the rivers and wetlands of the Lower Balonne system are presently in a reasonable condition, but this condition is expected to deteriorate if the present capacity to extract water from the system should actually be exercised. The draft Plan will enable the present full capacity to be utilised. It does, however, restrict access to flows during environmentally sensitive flows with the ability to compensate during high flow events, and further development of overland flow diversion is prevented.

The Independent Scientific Review Panel also identified significant information gaps in terms of managing flow regimes to achieve environmental outcomes on the Culgoa floodplain and Darling River in addition to limited information on Narran Lakes and the Ramsar wetlands.

With these constraints, the IAG is of the view the Plan could have applied a more precautionary approach in managing the flow regime to achieve ecological outcomes and further reduce the risk of damage which would be difficult to reverse.

The precautionary principle has been applied only in terms of minimising impact on irrigators.

The Lower Balonne Community Reference Group in effect recognised the risk to the environment by advocating additional research and a five year review of the River Operating Plan based on the findings of the research.

### **IAG Conclusion**

In the view of the IAG, the Precautionary Principle has not been adequately applied to protect ecological outcomes and downstream flows.

If the current Plan is to be implemented, the IAG supports the need for research into the ecological values of rivers in the Lower Balonne, Narran Lakes, National Parks and biota of the Darling River. The findings of the research could then provide the basis for a review and appropriate changes to the Resource Operating Plan.

## **8. Monitoring and Audit**

The Plan requires monitoring of:-

- stream flow;
- diversions;
- water quality; and
- natural ecosystems.

This monitoring requirement will be, in some instances, a significant increase over current monitoring and will therefore require additional resources.

### **8.1 Monitoring Diversions**

The Plan requires meters or other measuring devices to be placed on all diversions. For water harvesting, these meters will need to be able to measure the daily rate of water diverted to test compliance with the maximum rate specified on the licence. For some water harvesters it may also be necessary to establishing a system for recording on farm storage volume to ensure that they comply with their volumetric limits.

## **8.1 Auditing Compliance with the MDB Cap**

The Plan proposes that water is to be allocated and managed to be consistent with Murray-Darling Basin agreements and commitments, including implementing a Cap on the taking of water.

The IAG has been advised that the Water Resources Plan and the Resource Operations Plan will establish Queensland's Cap by setting out the water sharing and flow management rules that would apply to water entitlements. Queensland proposes that its Cap will be audited using the IQQM to model the authorised opportunities to divert water given the water sharing and event based management rules in the final Water Resource Plan and Resource Operations Plan. Comparison of the annual estimate of the authorised level of extractions from the IQQM modelling results will be compared with the actual measured water extractions in line with the Schedule "F" provisions. The IAG has been advised that the draft Plan also proposes additional monitoring and reporting provisions over and above those required for Cap compliance. This is essential given that the Queensland proposal is a rules based system.

### **IAG Conclusion**

The IAG considers that in view of the emphasis on a rules based system to achieve Cap diversion targets, the Resource Operations Plan should be audited by an independent technical auditor to provide assurance that the rules have the capacity to deliver on the outcomes expected.

## **9. Other Aspects of the Draft Plan**

There are a number of other items of note in the draft Plan:-

### **9.1 Floodplain Harvesting**

#### **Overland Flow in the Upper and Middle Condamine**

The Plan places effective controls on the harvesting of water (other than for stock and domestic supplies) of run-off before it reaches the rivers. Any new development would need to demonstrate no net reduction in stream flow.

### Overbank Flows in the Lower Balonne

The Plan for the first time regulates the diversion of water which has overflowed the banks and is flowing over the floodplain. Much of this water eventually returns to the river but, in the past, it has not been possible to control its diversion. Licences will be issued to control the extraction of this water and to limit overland flow take in many instances to substantially less than the present capacity of the existing overland flow take infrastructure if no controls were in place, based upon the operating arrangements in place immediately before the commencement of the Plan.

### **9.2 Rationalisation of Allocations**

The Plan involves improvements to the existing water licences including:-

- conversion of area licences to volumetric;
- metering of all diversions;
- establishment of maximum diversion rates and volumetric limits for water harvesters; and
- determination of nominal annual volumes for each licence which will form the basis of trade.

### **IAG Conclusion**

Within the constraints identified earlier, the WRP and associated ROP will provide the framework for managing and monitoring water use.

## **10. Conclusions/Recommendations**

- The process has been hampered in some places by the paucity of data and reliable information on some matters particularly environmental values, objectives and criteria. These difficulties are in part reflected in the limited analysis that has been undertaken of the likely downstream impact of the draft Plan notwithstanding the input of Professor Cullen and the Scientific Review Panel. The draft Plan has sought to overcome some of these difficulties by providing for a review after five years of operation. Also, it is noted that corrective action could be taken even before this scheduled five year review under the periodic reporting and review mechanisms provided for under the *Water Act 2000*.
- The moratorium levels of development results in an estimated mean annual reduction in flows at the border of 608 GL/year compared to predevelopment flows. There are also substantial indicative reductions in flows downstream of the Border.

- The proposed flow event management system is designed to ameliorate the ecological impacts immediately downstream, but is unlikely to have significant impacts further downstream. However, because of the constraints that the Plan places on the resources that may be used in these events and the provision for payback at a time of higher flow, compared to current conditions, event-based flow management is unlikely to increase, significantly the mean annual flow.
- While there is limited scientific basis at this time to identify appropriate flow regimes in terms of quantity and timing to meet specified ecological outcome criteria, the IAG notes that the Scientific Review Panel believes that the wetting regime proposed is a reasonable interim solution until further information is available from the Narran Lake project.
- In the view of the IAG, the Precautionary Principle has not been adequately applied to protect ecological outcomes and downstream flows.
- If the current Plan is to be implemented, the IAG supports the need for research into the ecological values of rivers in the Lower Balonne, Narran Lakes, National Parks and biota of the Darling River. The findings of the research could then provide the basis for a review and appropriate changes to the Resource Operating Plan.
- The IAG considers that in view of the emphasis on a rules based system to achieve Cap diversion targets, the Resource Operations Plan should be audited by an independent technical auditor to provide assurance that the rules have the capacity to deliver on the outcomes expected.
- Within the constraints identified earlier, the WRP and associated ROP will provide the framework for managing and monitoring water use.

## 11. References

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