

REVIEW OF CAP IMPLEMENTATION

PROGRESS REPORT

ON THE

QUEENSLAND WAMP AND WMP PROCESS

INDEPENDENT AUDIT GROUP
MARCH 1999

BACKGROUND

The Murray-Darling Basin Ministerial Council at its June 1995 meeting agreed to introduce a Cap upon diversions of water from the Murray-Darling Basin.

In the case of Victoria and New South Wales it was agreed that the Cap was the volume of water that would have been diverted under 1993/94 levels of development. In unregulated rivers it was agreed that the Cap may be expressed as an end of valley flow regime.

In the case of Queensland, the Ministerial Council agreed that any final agreement would need to await the completion of the water allocation and management planning (WAMP) process, the outcome of which will be subject to consideration by Council.

The Independent Audit Group (IAG) appointed by Council supported the WAMP process, but noted that:

- it must accommodate instream use not only in Queensland but also in the Border Rivers under the control of the Border River 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 WAMP be fully implemented, including assessment of downstream impacts in NSW;
- 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 of the WAMP process is conducted, including modelling of impacts on downstream Basin flows.

The Review of Cap Implementation 1997/98 by the Independent Audit Group noted progress on the implementation of the WAMP and WMP process for the Condamine-Balonne, Border Rivers, Warrego/Paroo/Nebine and Moonie rivers and advised that a draft WAMP was expected to be available for the Condamine-Balonne by June 1999 and the Border Rivers by December 1999.

The IAG was also advised that draft WMPs for the Warrego/Paroo/Nebine and Moonie rivers were unlikely to be completed until June 1999.

The Queensland Government has committed to providing an opportunity for the Commission and the Ministerial Council to review the outcome of the WAMP/WMP process.

The IAG has been given the task of undertaking an audit of the WAMP/WMP processes and in particular the IAGs assessment of the intermediate technical reports which underpin the WAMP process for the Condamine-Balonne.

PROGRESS WITH WAMPS/WMPS

Advice on progress with the WAMP process for the Condamine-Balonne and Border Rivers and the WMP process for the Warrego/Paroo/Nebine and Moonie rivers is summarised in the attached flow chart and in Table 1.

While significant progress has been made since the last IAG report in September 1998, draft WAMPs are not expected to be available before September and December 1999 for the Condamine-Balonne and Border River catchments respectively. The draft WMPs for the Warrego/Paroo/Nebine and Moonie rivers are also unlikely to be available before December 1999.

The further delays are due to a combination of the unexpected complexity of the WAMP process, difficulty in developing the IQQM models and the intimate involvement of Community Reference Panels.

The Condamine-Balonne WAMP is the most advanced with draft WAMP scenarios identified and expected to be available for assessment in July.

The IAG will further report on progress as part of its 1998/99 Water Audit.

IAG Conclusion

The WAMPs and WMPs for the Queensland component of Basin rivers are unlikely to be finalised before 30 June 2000. Draft WAMPs and WMPs should be available for Council consideration between late 1999 and mid 2000.

These WAMPs and WMPs should form the basis for Queensland's end of valley flow targets as part of the Cap.

TABLE 1 QUEENSLAND WATER RESOURCE PLANS PROGRESS REPORT

AS AT 25/3/99

	Border Rivers	Warrego/Paroo/ Nebine	Moonie
Process	WAMP Draft Plan due no earlier than Dec 1999	WMP Formal commencement of statutory process commenced Nov 1999 Draft Plan due no earlier than Dec 1999	WMP Formal commencement of statutory process commenced Nov 1999 Draft Plan due no earlier than Dec 1999
Hydrologic Analysis	*Calibrated IQQM model due by DLWC & DNR Mar 1999 *Calibrated crop models and entitlement modelling *Regulated areas modelled plus sensitivity on unregulated Granite Belt area	*IQQM models in initial development stage – by DNR *Entitlement modelling *Unregulated	*Modifications to model required *Entitlement modelling with calibrated crop models *Unregulated
Environmental Analysis	*Environmental scan completed *Expert panel workshops held	Overview document to be completed by Apr 1999	Overview document to be completed by May 1999
Economic Analysis	*Data is being collected from ABARE	N/A	N/A
Consultation	Community Reference Panel of key stakeholders formed and meetings have been held *Issues paper produced *Indigenous consultant appointed and clan meetings to be held Apr/May 1999	*Public meetings held Feb 1999 *Advisory committees for each catchment to be formed	*Public meetings held Feb 1999 *Advisory committee formed
WAMP: Water Allocation and Management Planning • WMP: Water Management Plan • IQQM: Integrated Quantity Quality Model			

THE CONDAMINE-BALONNE WAMP

The IAG members attended the tenth meeting of the Community Reference Panel in Brisbane on 25 and 26 March 1999.

The Reference Panel was attended by some 15 members representing irrigators, pastoralists, dryland farmers, community groups and specific interest groups. A number of Department of Natural Resources officers and consultants were also present to comment on number of draft reports and received updates on other reports in preparation. The last session involved panel members in developing a series of draft WAMP scenarios. Specific technical reports available were:

- Draft Environmental Flows Technical Report;
- Economics Technical Report;
- Water Availability and Entitlement Performance Technical Report; and
- Social Assessment Report.

For the purpose of auditing the IAG assessed each of the reports and the Panel process on the following criteria:

- technical merit;
- bias;
- all community views represented;
- capacity to provide a foundation for an equitable WAMP outcome;
- was the precautionary principle applied? ; and
- were downstream impacts considered?

Specific comments on each of the four technical reports of the Condamine-Balonne WAMP are now presented.

Draft Environmental Flows Working Technical Report for the Condamine-Balonne WAMP

An important component of the WAMP process is to establish environmental context for river health.

A Technical Advisory Panel (TAP) has identified elements of the flow regime that impact on the environment. Principles were also developed for flow management:

- flow events occurring in the summer period (September to March) should have a higher environmental priority;
- flow events of a particular magnitude should have a higher environmental priority if they have not occurred for a long period of time.

The condition of segments of the Condamine-Balonne was determined using an Index of Stream Condition (ISC) with five main components:

- hydrology;
- physical form;
- streamside zone;
- aquatic life; and
- water quality.

The average scores within the river zones ranged from 57% for the armoured zone to 67% for the mobile zone. This compares with the following standards:

<50% poor condition
50-70% good condition
>70% excellent condition

Because of an absence of historical physical and biological data for the Condamine-Balonne, the Technical Advisory Panel has proposed a benchmarking technique using a series of comparable rivers where flow statistics and ecological impacts are available.

Information was obtained for the Gwydir, Namoi, Macquarie, Lachlan and Murrumbidgee comparing flow regimes with environmental parameters. The working draft proposed key flow statistics. However these are still subject to further development.

IAG Comments and Conclusions

The Community Review Panel raised comments on the adequacy and representativeness of the samples. It also questioned the benchmarking technique and the key flow statistics. It was also noted that an assessment of the Narran Lakes was also required. Discussion by Panel members highlighted some tensions as it started to become evident that this report would provide a basis for determining environmental flows.

The IAG recognises that there is no off the shelf methodology for establishing flow regime relationships with environmental health of the river for a system with high intra and inter seasonal variability.

Because of the importance of the link between environmental and health indicators and critical flow data and the latter's importance to the WAMP process, it is suggested that a peer review be concluded of the Technical Assessment Panels final report and the Department for Natural Resources has advised that this would be undertaken and/or commissioned by the Queensland Environmental Protection Agency.

The draft working report failed to address the issue of downstream (non-Queensland) impacts.

The Department for Natural Resources believes that this Technical Report should only deal with the area directly covered by the Condamine-Balonne WAMP and that the NSW Department of Land and Water Conservation (DLWC) would be provided with the simulated outflows from the WAMP scenario model runs. The IAG were advised that DLWC has agreed to provide an assessment of the hydrological and environmental downstream impacts to the extent of the end of the Barwon-Darling system.

The IAG is not concerned as to who does the modelling. It is concerned however if the decision making process does not take into account post border impacts. These should include hydrological, environmental and economic impacts.

The IAG and the Ministerial Council supported Queensland's proposal to use the WAMP process to establish end of valley flows. This was however conditional upon downstream impacts being considered.

Economics Technical Report for the Condamine-Balonne WAMP

The Condamine-Balonne Economics Technical Report endeavours to provide a methodology for the assessment of the economic effects of changes in the access to water in the Condamine-Balonne region. The methodology proposed focuses upon the region itself and does not attempt to look at areas outside the region. However, the methodology does attempt to differentiate between the Condamine and the Balonne sub-regions.

The methodology is based upon an Input-Output (I-O) model of the region which has been prepared with the help of the Australian Bureau of Statistics. By necessity, there have been a number of significant simplifying assumptions made in order to prepare I-O estimates at the regional level used in the methodology. These assumptions are acknowledged as being limitations of the data that are available to the analyst. However, provided the limitations of the methodology are recognised and factored into any evaluation performed using the methodology, then the chances of drawing incorrect conclusions are minimised.

In particular, it is important that in any use of the methodology, particularly where it is likely to involve measurement of changes over time, the limitations of the I-O data are fully recognised. Of special significance are the technical and structural rigidities of the I-O table, that is its failure to recognise that there are exogenous factors which also impact upon the future structure and performance of the economy. The I-O based methodology assumes that there is an instantaneous movement from one equilibrium position to another equilibrium position, rather than a process that will take time and involve other changes. As a consequence, the extent of the economic impact that is suggested by the proposed methodology may not be as stark as implied by the modelling especially as the regional economies concerned adjust over time.

The inability of the I-O based methodology to deal with this problem of time is perhaps best reflected in the incremental changes in water availability that are assumed in the scenarios used in the current draft of the economic report. In the examples quoted, the methodology generates a net economic impact when access to water is reduced and a number of assumptions are made as to how different types of irrigation based farming activity switch from irrigation to dry land farming. In practice, irrigators face not insignificant swings in the availability of water on a season by season basis. The availability of private and government funded storage facilities on the river system endeavour to mitigate against the impact of these seasonal variations. Nevertheless, irrigators as a matter of course make major decisions on an annual basis concerning the size of crop that they will grow under irrigation in that season, and do so without necessarily creating major economic dislocation for the regional economies concerned.

Despite the regular nature of these types of decisions, the community and economic activity in the region overall does not change to the extent that a simple mechanical application of the I-O methodology would suggest. Irrigators and the community as a whole have learnt to live and function within an economy that has this type of variability in economic activity. Thus, care must be taken when running scenarios using the proposed methodology lest too great an emphasis be placed upon the impact of small shifts in the availability of water which will have very little or possibly no impact at all on economic activity in the region.

The critical issue for the economies of the regions will be the size of any change in the access to water, and the extent to which the community has forewarning of this change and can prepare itself for change. For example, with an existing commitment to private and public infrastructure of many types in the regions, economic activity is not about to decline or grow over night as a result of the withdrawal of access to water or the availability of greater amounts of water. There will be a financial incentive for existing participants to find other ways to utilise their assets, particularly those that can not be readily moved out of the region should there be a cut back in available water resources. The methodology does not factor into its calculations this reality.

With adequate warning that water access is to be reduced, it can be expected that existing irrigators will look for ways to maximise the productivity of the water that will still be available to them. This may encourage greater use of water saving devices which might not otherwise be used if water is seen as being relatively abundantly available. Similarly, if additional water is to be made available, while there may be some extension of farming areas using irrigation in the area, this does not necessarily mean that there will be maximum productivity achieved from the new water. Rather, the result could be an incentive for irrigators to be wasteful at an individual farm level simply in order to get access to the water in anticipation that at some future time it will be of value.

The model also suffers from the fact that it does not address the issue of the economic value of the water outside the two designated regions. Rather it is assumed that water is a free good which has no other productive use beyond the region. As a result, there is no consideration of the potential for a greater economic value to be attached to this water if it is allowed to travel further down the Darling system. This failure exists even in terms of a comparison of the net economic benefits between the Condamine and Balonne sub-regions. If the results of the WAMP process are to be meaningful they must address the question of whether or not there is greater economic value from allowing the water to pass beyond the Condamine-Balonne regions. The Department for Natural Resources agree that it would expect advice on this issue from the DLWC and the NSW landholders on the panel.

The methodology proposed for the economic modelling does not look at the 'net' economic effect in the sense that there are other factors which must be considered along with the purely economic consequences. This is to some extent addressed in the Environment and Social Assessment methodologies. However, this places considerable weight upon the 'decision tree' methodology that is proposed.

IAG Conclusion

The IAG considers that there is a need to recognise the limitations of the economic model proposed and that the WAMP process should not rely upon a simple mechanistic application of this model. The IAG is also concerned that no attempt appears to have been made to consider economic impacts beyond the Condamine-Balonne region.

Water Availability and Entitlement and Performance Technical Report for the Condamine-Balonne WAMP

This report describes the statistics that have been selected to describe the volume and reliability of the water available for diversion or beneficial flooding under the various WAMP scenarios. These statistics have been selected such that they can be derived directly from the IQQM output. The statistics chosen cover all the key user groups within Queensland including the regulated entitlements, unregulated irrigation entitlements, waterharvesters, overland flow harvesters, stock and domestic users and beneficial flooding. There is also a good coverage of the different districts within Queensland with all significant Queensland groups covered.

For the most part the statistics that have been selected are appropriate. Some additions that might assist in the calculation of economic impact are:

Regulated entitlements

- Average water use
- Average % allocation

Unregulated irrigators, waterharvesters and overland flow harvesters

- Average % of maximum area irrigated
- % of years maximum area irrigated
- Average water used on crops (diversion minus storage losses)
- Irrigation efficiency (Average water used / Average water diverted)

Beneficial Flooding

- Average area inundated each year
- Area inundated one year in five
- Area inundated one year in ten

A reason for including statistics on irrigation efficiency and percentage of maximum area irrigated for waterharvesters relates in large part to the discussion on the size of storages and percentile of flows that will be harvested. It can be expected that the water use efficiency and supply reliability will decline as storage size is increased to harvest the less reliable flows.

A major omission with this report is that no mention is made of interstate water users. The IAG believes that as a minimum, the following additional statistics are required.

Barwon/Darling Irrigators

- Average water diverted
- Average % of maximum area irrigated
- % of years maximum area irrigated
- Average water used on crops (diversion minus storage losses)
- Irrigation efficiency (Average water used / Average water diverted)

It is understood that DLWC has agreed to provide this assessment

Lower Darling Irrigators downstream of Menindee Lakes

- Average water used
- % of years full entitlement allocated

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River Murray Irrigators

- Average water used
- % of years full entitlement allocated

IAG Conclusion

The IAG considers that the WAMP report must include statistics on water availability downstream of the Queensland border and has suggested some key statistics for water use on the Barwon/Darling, the Lower Darling and the River Murray.

Social Assessment Technical Report for the Condamine-Balonne WAMP

The Social Assessment Report was prepared as a basis for evaluating the social implications of different draft WAMP scenarios. As indicated in the section dealing with the Economic Technical report, it is difficult to separate economic and social issues with change in farm income flowing through to farm employment, industry employment, unemployment and population. There are also limitations with the data that are to be used, in particular data on employment, demographic trends and business activity at an LGA level which will not be available in such detail from the Economic Assessment model.

A survey and a number of community workshops identified issues of concern to communities.

The community Reference Panel has endorsed a number of quantitative and qualitative contexts to assess impacts. The qualitative context has a very high correlation with economic criteria and could lead to double counting.

Similarly the qualitative context include elements which overlap with other criteria and or are difficult to form a judgement on.

IAG Conclusion

Similar comments concerning downstream impacts apply. Again there is a danger that the assessment model could be too focused on the Condamine-Balonne and not recognise the wider implications.

MULTI-OBJECTIVE DECISION SUPPORT SYSTEM

An outline of a computer based decision framework was provided as a basis for assessing the impact of draft WAMP scenarios on:

- water availability and entitlement performance;
- environmental;
- social;
- economical; and
- cultural.

The Multi-objective decision support system is a tool to assist decision-making. The user proposes a criteria tree which is used to weight the outcomes and rank the options. It is however only as useful as the criteria utilised and the scorers understanding of these criteria.

The IAG is concerned that the sample Upper Condamine criteria tree includes a number of criteria that are symptoms of the same output ie. farm income. Inclusion of multiple highly correlated variables has the potential to bias the outcome. The IAG acknowledge that the criteria tree presented was only a sample and expect that the final criteria will focus on key criteria and eliminate multiple correlated variables.

IAG Conclusion

The IAG considers that the number of indicators should be reduced, should not include variables highly correlated with each other and could better focus on the key community issues not already covered by environmental or economic criteria.

DRAFT WAMP SCENARIOS FOR THE CONDAMINE-BALONNE

The Condamine-Balonne WAMP process has reached the stage where it is possible to develop a number of WAMP scenarios, assessing the impacts and making choices on preferred outcomes in terms of a balance between river health and consumptive use.

The elements of the proposed WAMP scenarios are summarised in Table 2.

Currently twelve scenarios are proposed:

- 1) Full development of existing entitlements
- 2) Full development plus five new weirs
- 3) Full development plus new waterharvesting licences
- 4) Full development plus five new weirs and new waterharvesting licences
- 5)-8) As for 1 to 4 plus flow management to achieve a first level of environmental outcomes
- 9)-12) As for 1 to 4 plus flow management to achieve a second level of environmental outcomes

The flow management rules to achieve the environmental outcomes have yet to be developed.

The Community Reference Panel has approved the running of these scenarios prior to its next meeting to allow discussion on the findings. Other scenarios are contemplated, but the Reference Panel is anxious to have some data which it can review and test out the decision-making processes that are proposed.

The full development scenario assumes full uptake of sleepers, the construction of St George Off-stream storage and Dalby TWS, further growth in overland flow harvesting in the Upper Condamine and the construction by waterharvesters of sufficient on-farm storage to enable them to completely harvest all the flow in their licensed flow windows in nine years out of ten. It also includes volumetric caps on waterharvesters but these are set at volumes that just permit waterharvesters to harvest all the flow in their licensed flow windows in nine years out of ten.

Some waterharvesters may have developed to this level but many have not. The base scenario therefore represents significant growth in diversions above current levels.

IAG Conclusion

The IAG is concerned that taking the full development scenario as the base case for the WAMP scenarios may not fully explore the impacts that the development of existing entitlements may have on the environment and on downstream water users. This is especially the case since it appears to the IAG that the interpretation of those development rights is very generous to the existing entitlement holders.

The IAG would prefer to have the existing development as the base case and would like to include 1993/94 level of development as a WAMP scenario to assist in the assessment of the WAMP by the downstream States.

TABLE 2 CONDAMINE-BALONNE WAMP DRAFT WAMP SCENARIOS

ISSUE	SUGGESTION
Overland Flow Harvesting	Adopt position on Upper Condamine Floodplain Harvesting after checking significance of position based on economic viability
Previously Announced / Approved Entitlements	<ul style="list-style-type: none"> • St. George OSS with filling principles based on philosophy within Ministerial Report • Dalby TWS allocation to be included
Sleeper Entitlements	Build on Case 20-4x
Environmental Outcomes & Flow Management	Model flow management to give 2 levels of outcomes
Volumetric Limits on Water Harvesting	Limits based on volumes diverted after integrating flow management and to be based on fixed percentiles across all threshold levels within each major management reach
<p>New Allocation</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>Elbow Valley Dam to be tested prior to Draft WAMP Scenarios</p> </div>	<p><u>Weirs et al (SWP & WITF)</u></p> <ul style="list-style-type: none"> • North Toolburra Weir (Danpork) • Brigalow Weir (Power Station) • Nangram Weir • Condamine Weir • Bungil Creek WH <p align="right">Generic Water Harvesting</p> <ul style="list-style-type: none"> • Warwick • Upper Condamine • Chinchilla • Surat • Maranoa • Lower Balonne

SUMMARY

PROGRESS WITH WAMPS/WMPs

The WAMPS and WMPs for the Queensland component of Basin rivers are unlikely to be finalised before 30 June 2000. Draft WAMPS and WMPs should be available for Council consideration between late 1999 and mid 2000.

These WAMPS and WMPs should form the basis for Queensland's end of valley flow targets as part of the Cap.

CONDAMINE-BALONNE WAMP

Draft Environmental Flows Technical Report

The IAG recognises that there is no off the shelf methodology for establishing flow regime relationships with environmental health of the river for a system with high intra and inter seasonal variability.

Because of the importance of the link between environmental and health indicators and critical flow data and the latter's importance to the WAMP process, it is suggested that a peer review be concluded of the Technical Assessment Panels final report. Queensland accepts this and the Queensland EPA has been suggested as the appropriate body to do or arrange this.

The draft working report failed to address the issue of downstream (non-Queensland) impacts and it has been suggested that this is the responsibility of the NSW Department of Land and Water Conservation.

The IAG and the Ministerial Council supported Queensland's proposal to use the WAMP process to establish end of valley flows. This was however conditional upon downstream impacts being considered. Downstream impacts can only be assessed if river health criteria are available.

Economics Technical Report

The IAG considers that there is a need to recognise the limitations of the economic model proposed and that the WAMP process should not rely upon a simple mechanistic application of this model. The IAG is also concerned that no attempt appears to have been made to consider economic impacts beyond the Condamine-Balonne region.

Water Availability and Entitlement Performance Technical Report

The IAG considers that the WAMP report must include statistics on water availability downstream of Queensland and has suggested some key statistics for water use on the Barwon/Darling, the Lower Darling and the River Murray.

Social Assessment Technical Report

Similar comments concerning downstream impacts apply. Again there is a danger that the assessment model could be too focused on the Condamine-Balonne and not recognise the wider implications.

Multi-objective Decision Support System

The IAG considers that the number of indicators should be reduced, should not include variables highly correlated with each other and could better focus on the key community issues not already covered by environmental or economic criteria.

Condamine-Balonne Draft WAMP Scenarios

The IAG is concerned that taking the full development scenario as the base case for the WAMP scenarios may not fully explore the impacts that the development of existing entitlements may have on the environment and on downstream water users. This is especially the case since it appears to the IAG that the interpretation of those development rights is very generous to the existing entitlement holders.

The IAG would prefer to have the existing development as the base case and would like to include 1993/94 level of development as a WAMP scenario to assist in the assessment of the WAMP by the downstream States.