

**Environmental Water Allocation Forum**  
**28 - 29 May 2009**  
**National Museum of Australia, Canberra**  
**Summary of Proceedings**

These notes record the main points raised in the Forum's plenary report back sessions, as well as key issues discussed in individual small group sessions.

## **1. Regulated systems**

*Questions posed:*

1. *How can we make best use of limited water for the environment in regulated systems, what is the science telling us, what are the key principles for water managers?*

*OR*

2. *What can environmental water managers do when a severe/prolonged drought occurs - what is the science telling us, what are the key principles to apply?*

### **Environmental water management context:**

- Acknowledge that governments and regions have done much planning in recent years but we are slow to implement; management responses still tend to be more short term and reactive.
- Accept that water managers are in the business of managing risks and will always have difficult choices to make about what are the most critical interventions – i.e. there is acceptance that sacrifices of some environmental 'assets' will most likely have to be made in many situations.
- Recognise that managers and policy makers will need to continue to make decisions now (i.e. on a rolling short term basis) and cannot necessarily afford to 'wait' for science. Integrating science into management is necessary – adaptive management provides a framework to do this.
- Develop a systems approach that water managers can use to identify and rank all environmental assets and their water requirements, as well as their likely response to drought - use this to underpin a triage approach to allocating environmental water.
- Policies relating to water allocations need to be integrated, in particular with tax breaks and welfare policies.
- Ensure the wider community is engaged with the use of water for environmental purposes by explaining the science involved and considering the costs and benefits of environmental allocations and likely consequences of 'do nothing' scenarios. This approach means that stakeholder involvement facilitates finding common ground and understanding between all parties involved.

- Ensure that water plans and policies recognise local and cultural knowledge as this is important in building community confidence and support. Involvement (or the lack thereof) of Indigenous communities is particularly important as there has been very little effective engagement. Indigenous people have extensive cultural knowledge about their local waterways, yet much of this knowledge is under threat of being lost as a result of Elders being unable to pass their knowledge on to future generations.
- Endeavour to have common definitions of key words and concepts so that stakeholders are all talking about the same thing. There is a need to be sharing the same language so that decisions can be informed by all, and not a few.
- The level at which decisions are made is important – ministerial – regional - local – there is a need for all stakeholders to know at what level the final decision is made and what their role is in that process.
- Recognise that the Commonwealth can only buy water from willing sellers – this means we need informed communities to be able to participate in decision making about environmental water allocation, and new processes to better manage those allocations once they are made.
- Recognise connectivity between social, cultural, economic and environmental outcomes in the new management paradigm that is required for environmental water allocation.

#### **Science underpinning environmental water management:**

- There is a need to ensure that science and research is undertaken with a practical end-point in mind so that results can inform decision making and water management actions. This could be achieved by investing in the development of better approaches and models for fostering collaboration between scientists and practitioners, for example, the notion of creating ‘knowledge management gateways’, hubs of information, and communities of practice where science and techniques can be discussed, and joint management options developed. This sort of interaction would create better contexts for mapping research needs in a way that is relevant to policy and management.
- There is a need to influence the culture and reward structures for scientists, as these processes do not reflect the need for ensuring research results are relevant to practitioners.
- If properly planned and coordinated, there are good opportunities to use the process of monitoring environmental flow outcomes to engage scientists (in both planning the approaches and also in using the data to inform scientific experiments) and through this develop the means for deeper levels of collaboration. This could assist in placing management into more of a truly adaptive management framework
- Managers would like assistance to help make sense of one-off observations (e.g. ‘blackwater’ events resulting in fish kills).
- There is a need for both generic and site specific research (as each place and its circumstances are different), noting there is a concern that research results are often generic and hard to apply to specific management problems.

- There is a scientific and management challenge of how to manage at a bigger system level, as opposed to a series of isolated ecosystem assets – how can we understand and manage the connections between assets in catchment and river systems, and then scale this understanding up?
- There is a need for research into understanding the life cycles and dynamics of components of a system (e.g. fish or macro-invertebrates) as well as the ecosystem overall. How can we develop better frameworks to assist managers to integrate specific science into a broader ecosystem context?
- More work needs to be done on understanding environmental requirements at low flow and ‘extreme’ conditions. It could be the case that the extreme conditions become the norm under climate change.
- Investigation is required to identify key drought refuges and fill existing knowledge gaps and understanding about how long these systems can be maintained under drier conditions.
- More work is also required on improving the knowledge of population connectivity.

### **Improving management of environmental flows**

- Improve the security of environmental water (i.e. it should not always be the first water entitlement to be foregone under dry conditions)
- Consider new ways of buying environmental water entitlements, for example, temporary water; a system/framework of water options; carry over of water so that, for example a reserve could be built up for flood/overbanking if there is no high flow event in 5 years.
- Improve land and water management under ‘normal’ conditions to build resilience of ecosystems to cope with drought.
- Plan for drought and review priorities in time to make best use of what water may be available.
- Provide adequate funds for effective monitoring and evaluation of the effects of environmental water flows and of the condition of key environmental assets. This is essential to support adaptive management.
- Consider the possibility that maintaining an average annual flow may be the best option when knowledge of environmental water needs is unavailable. However, recognise that the approach is unlikely to be the best use of scarce water, or to achieve environmental goals in the long-term. Recognise that if such an approach was built into legislation/regulation, it may act to reduce the benefits achieved from environmental allocations.
- Use releases of consumptive water, conveyance rules and flows, natural flows from unregulated tributaries, purchase of allocation flows, or other means to deliver and optimise the value of environmental water.
- Consider water quality as well as quantity in managing environmental allocations.
- Learn from environmental watering mistakes - too often mistakes are poorly reported to avoid embarrassment or for political reasons.

- Increase the flexibility of use for managers, for example, the capacity to accrue more relevant volumes of environmental water in storages (eg using carry-over or capacity sharing rules).
- Develop better tools to assess the effectiveness of flooding and ecological responses.
- Develop better ways of using on-ground interventions in a timely manner.
- Water shepherding of environmental water needs further resources and effort so that it is more effective and stakeholders better understand what is being achieved.
- Develop further understanding of which water refuge pools need to be prioritised for protection, for example, when are the trigger points, when will the pool dry out, where can stock access/domestic access be met.
- There is a need to further refine the timing/patterns of pulses for irrigation flows so that environmental benefits are also achieved. The key issue is the need to quantify how much water is needed to get these environmental benefits.
- Systems need to be defined as to what water constitutes an ‘e-flow’ – for example is the e-flow to maintain refuge pools, to maintain a corridor of riparian veg, or to do both?
- Accounting for the impacts/outcomes of environmental water is difficult - managers can account for timing and release of flows, but may be able to quantify environmental outcomes as a result of the environmental water for many months, sometimes years.
- Consider drought as a positive event in that it forces decisions about how water will be used, focuses community engagement and scrutinises the accuracy and meaningfulness of the science being undertaken.
- Increase understanding about building ecosystem resilience as a key need to allow systems to survive inevitable drought sequences. Building resilience involves many factors, for example, water quality and land management activities can have interacting or over-riding effects. This means there needs to be an investment in science to better understand these water quality land management effects and interactions with water management.
- Water pricing needs further work so that water can be allocated to high value users like the environment – there is a need for the environment to become a key market player.

### **Role of water managers**

- Respond to the training needs of environmental water managers, especially in preparing to manage limited water in a dryer and more variable climate

## 2. Unregulated systems

*Questions posed:*

3. *What are the key principles for managing flow in unregulated systems for environmental purposes?*

OR

4. *How can the principles for managing flow best be put into practice? (Eg flow rules, licensing conditions, models, planning methods, data)*

### **Water planning in unregulated systems:**

- Although enforceable, statutory guidelines and conditions are required to provide a legal backing to water plans and licences, they need to allow responses to community impacts and to provide flexibility for adaptive management of environmental allocations.
- Periodic review of water plans, licences and abstractions is essential and should be linked to impacts and evaluation of any changes in the condition of environmental assets.
- Water plans and licence conditions are of little use without adequate policing for compliance and penalties for breaches - it is also important to build trust in the system regulator and in the transparency of decisions, for example, by effectively communicating about flow and licence rules, current water availability etc.
- Water Plans need to include thresholds (eg of flow) that will trigger a management response, for example, to release water or to cease abstractions. These Water Plans should also set conservative limits on total allocation to consumptive uses and consider both current and likely future flows. Socioeconomic and environmental risk profiles also need to be included.
- Institutional and management structures should reflect the scale at which environmental water management is to be undertaken, for example, whole catchment vs. a river reach or individual wetland.
- Holders and managers of environmental water need to be flexible in their operations, for example, so that they can buy access to a particular event-based flow rather than relying exclusively on entitlements.
- There is an underlying issue of the potential impacts of sleeper licenses.
- There is a need to plan far more effectively before an environmental release to be able to better respond to scenarios as they emerge before, and during the release.
- Better communication about Water Plans, their objectives, why particular water allocations are being made etc. needs to occur so that stakeholders understand why Water Plans are being used. Communicating about the allocation limit, the 'rules of take', the objectives that are being sought etc. needs to use common-sense language that can be easily understood and applied to the local context.
- Social marketing techniques could be used to better communicate what Water Plans are trying to achieve. Trust and confidence needs to be built in communities adversely affected (particularly in an economic sense) by water planning decisions.
- Compliance needs to be adequately funded so that when people go against the Water Plans retribution occurs and the community knows that there are consequences when rules are ignored.

- Monitoring and evaluation should include cumulative effects, outcomes over time, and different events. Improved monitoring of rainfall and knowledge of hydrology/flow relationships also needs to occur.
- Water sharing rules need to be changed as monitoring and evaluation data becomes available - not 10 years after the fact.

**Science underpinning management:**

- Ephemeral systems are hard to manage by volume - they need management strategies that are tailored to meet their particular requirements.
- Water managers need to have greater knowledge about their catchment/system in terms of its ecological values under different spatial scales, before investing in potentially inappropriate management strategies.
- A whole-system model is required to support the management of environmental water. The model needs to include impacts of surrounding land use and take account of tributary flows and the environmental assets they are likely to affect. The model should be based on catchment geomorphology (a primary driver of flow) and consider groundwater/surface water interactions, as well as the effect of interception by farm dams and other structures
- More work is needed to understand the impacts of using peak flows. There are potential adverse impacts in taking peak flows, as this may damage ecosystem resilience through boom and bust cycles.
- There is a need to invest in better rainfall, topographic, hydrological data sets (eg, LIDAR); better telemetered metering and monitoring networks; and, flow-inundation / commence to flow models with great coverage across Australia. These models need to be linked to conceptual models and ecological response models.

### 3. Water Policy and other instruments

*Questions posed:*

5. *Which policy instruments are best suited for particular situations? (Eg providing new water allocations, clawback of over-allocation, taking account of the environment as a water user)*

OR

6. *Do we have all the policy instruments we need to make environmental water allocations work-what else may be needed?*

- Political will is required to acknowledge when a system is 'over allocated' and resources are then needed to develop policy that adequately compensates those stakeholders that are penalised. Current policy instruments are too constrained by existing/historic practices that poorly define what an 'environmental asset' is worth. This means that it is difficult to understand and value what the Commonwealth is buying with their 'environmental water'.
- 120 years of history of water laws needs to be changed to meet environmental needs. Clearly this is a complex process and there will be many compromises needed. The Basin Plan is an opportunity to change rules and regulations so that the environment becomes a priority. The first, rather than the last parcel of water needs to go to the environment. In order to do this, key ecological assets need to be known and a value placed on them.
- Environmental water management is being attempted within legislation and policy that has evolved for regulating extractive water use. This is resulting in some "bad fits" for environmental water managers where unnecessary constraints are arising which limit the flexibility and better application of water. Some legislation requires approvals which are probably not necessary for environmental water use. Equally "green to the sea" seems to be difficult to achieve because of the fragmentation created by current water management instruments. It is likely some of these constraints could be lifted without risking water user security or cause any change in the water entitlement "characteristics".
- For most jurisdictions, there are many water policy tools and other instruments available (both market-based and rule-based), but not all are used and, more importantly, there is little evaluation of their effectiveness.
- A major issue in many jurisdictions is that different water users (urban and regional authorities, irrigators, stock and domestic users, the environment) are covered by different legislation, policies, and administrative bodies. A whole-of-system approach is urgently needed so that all stakeholders know what their entitlements are and the rules of engagement for water management.
- Links between land-use and water plans are generally non-existent or poorly developed.
- Policies often do not take account of the management of 'non-plan water', or of all users in establishing environmental flows. Policies often do not require the accreditation of all water users, and use poorly-defined terms (eg 'maintenance water') that can be interpreted a number of different ways. This does not assist stakeholders in applying the policy in 'real-life' situations.
- Water policies should cover quality as well as quantity.

- Environmental and operational water needs to be seen as inter-dependent and operating within the same system. Integrated decision making can assist with management – simple systems/intuitive understanding of their catchment – there are managers who understand their system and know how particular volumes will impact on parts of their catchment. This experiential knowledge needs to be valued on a par with ‘technical’ knowledge.
- There is a general lack of ability (and sometimes willingness) to enforce compliance with water policies or other instruments.
- Some rules and the way they are managed impede flexibility to use limited water to best effect. Water policies could include provision for rules (eg licence conditions or environmental releases) to be varied or reset under certain circumstances, for example a defined high-flow event
- Simpler entitlements and rules might lead to greater trading and the movement of water to higher-value uses, including the environment. Complexity of policy instruments should match the water use issues being addressed.
- Policies based on sharing storage capacity rather than water volumes, would allow greater carry-over of entitlements and provide opportunities for counter-cyclical trading. This has potential benefits for both environmental and consumptive users.
- Estuaries and their flows are generally not covered by water policies or plans. In general, they are included in separate policy settings.
- Despite significant national gains in recent years under CoAG, the National Water Initiative, and Water Act 2007, we are still unable to adequately secure, procure, protect, manage, or deliver environmental flows. For example, there is a pressing need for national principles for the provision of water for ecosystems – the old ANZECC principles have been eroded and need to be reaffirmed.
- There is a need to develop policy instruments:
  - to protect estuarine ‘end-of-system’ flows to protect end of system assets;
  - protect flows in ‘unregulated’ systems; and,
  - protect tributary flows.
- More work is required to be able to define and protect a minimum or base flow for the environment. Often legislated water allocation processes are too rigid and work against the adaptive responses necessary to achieve environmental outcomes.
- There are clear and pressing policy gaps in terms of indigenous water issues:
  - Australian Aboriginal and Torres Strait Islanders are usually considered ‘stakeholders’ rather than the actual or legitimate native title owners of land and water rights, as established under the various Mabo Native Title cases.
  - The capacity of Australian Aboriginal and Torres Strait Islanders to engage productively in water sharing discussions is critically compromised – indigenous communities are significantly disadvantaged in terms of language, scientific knowledge, the systematic undervaluing of traditional / customary knowledge systems.

- Inadequate cultural mapping exists of Australian Aboriginal and Torres Strait Islanders water assets and values.
  - The proposed criteria for the identification of High Conservation Value Aquatic Ecosystems sites or systems does not take adequate account of Australian Aboriginal and Torres Strait Islanders water values.
  - ‘Indigenous water’ is variously described, managed, and allocated under state and territory water legislation; and is seen as a version of ‘environmental’ water.
  - There is a critical lack of indigenous participation in water decision making.
- There are policy gaps in terms of monitoring, for example, deficiencies in metering, telemetry, monitoring networks, compliance and enforcement actions.
  - Unregulated flows are not legislatively protected at the moment – a policy change is required to protect these flows.
  - Ecological assets would be able to be better appreciated if they were given a dollar value. When negotiations around water occur in a region, other stakeholders (eg irrigation groups, towns-people) know how much their assets are worth and how much water they need to maintain them. Most often, environmental assets are not understood or expressed in this way making it difficult for environmental managers to state their case.
  - Improving the flexibility for stored environmental water with carry-over and capacity sharing provisions being identified would be useful. These provisions are commonly used on many systems and should be adopted more widely. The manner by which capacity sharing works is fairly complex, but it does offer an option whereby water owners have greater flexibility and control of their business. It was identified that the “tool kit” for environmental water managers needs to have these options available, but also a relevant/agreed with the needs of extractive water users. “One size fits all” is not a likely outcome.
  - Environmental water managers should have the capacity to purchase allocation water, mostly likely in emergency situations. While this purchase and use option is apparently not favoured, it could become more feasible if environmental water managers could accrue revenue, particularly when operating at broad geographic scales (eg MDBA or CEWH) where there are differing circumstances for stored water availability (eg could sell allocation in wet areas and buy allocation in dry, emergency areas).
  - The use of alternative water products, eg lease arrangements, should be more widely considered for environmental water managers, i.e. expand the “tool kit”. Water Accounts could be used so that water accrues for the user and their use can be tracked and monitored.

## 4. Water Planning


*Questions posed:*

7. *How can we monitor and evaluate whether environmental water needs are being met by a water sharing plan, what data and methods should be used?*

OR

8. *What does a competent water plan look like and how can we achieve environmental outcomes through our water planning?*

- To meet its purpose, monitoring and evaluation should be undertaken independently of water managers, the indicators that are measured should link directly to agreed environmental goals, and results should be made public.
- Methods are available that link different potential environmental outcomes to flow requirements and flow conditions. These methods should be incorporated into the water planning process.
- Lack of knowledge of low-flow impacts has prevented the development of effective low-flow management rules and monitoring methods, especially in highly-episodic, unregulated systems.
- Improved seasonal prediction would enable managers to better plan water allocations, using environmental and socioeconomic risk assessments and a range of flow scenarios.
- Whilst there are many environmental water policy and planning instruments, there is little apparent translation of this into practice, for example, the use of tools like counter-cyclical trading of water allocations by either environmental water holders or consumptive users. These tools may be more efficient and effective in getting the outcomes we want, yet remain largely unused.
- We have a good suite of, or many, ‘change instruments’ (e.g. R&D, education, extension, regulations, caps, exit fees, incentives, buybacks etc) but people are not convinced about how these are applied as a coordinated package. Sometimes these instruments operate at different levels of government and may actually be perverse in their intents and outcomes (e.g. Vic 4% cap on water trades compared to what the Commonwealth and other states are trying to do)
- There are often disconnects in policy, for example between environmental clawbacks and buybacks, and in managing the impacts of these on users and the affected communities.
- It is one thing to have a policy or a plan for environmental water allocations, but quite another to have the right information and instruments to implement it, e.g. if one does not have meters to know how much water is being used in a given (say unregulated) river system, how can one even know how much is available let alone enforce an allocation?
- We need compliance with plans but if we can’t measure water properly we cannot enforce rules.
- Putting environmental sustainability first in the Basin Plan is good but will it work? In general we make marginal changes to our policies and planning, which are already complicated. There is a need to think about a much more fundamental re-design of the institutional system – for example, a law reform commission?

- Could a more fundamental re-think of our laws and institutions help us, for example, standardise the mix of water entitlements across the MDB? If so, it would make trading work and enable environmental allocations to work.
  - More work needs to occur to examine institutional options, for example the potential of nested or co-governance structures and that devolve power over decision-making (and compliance) to local groups – i.e. create more local management rules for allocating water
  - There has been a tendency to use static planning models when we could explore the use of more dynamic rules-based models that can be more flexible and responsive to particular scenarios and events as they happen (e.g. major rainfall events after a long dry).
- 

## 5. R&D priorities

The following were identified during the discussion sessions as requiring further work (no priority order):

- Better understanding of the links between climate, geomorphology, flow and aquatic ecology to provide the integrated knowledge required for effective planning and management of environmental water.
- Further develop, test, publicise and train managers in methods to link flow scenarios with likely environmental outcomes, and to understand the measured flow requirements of different ecosystems and sites to water levels and connectivity along, and adjacent to the channel
- Greater understanding of low flow (level, duration, and season) impacts on different ecosystems, and of alternative management responses under drought. Identifying thresholds for irreversible effects also needs to be studied.
- Methods and frameworks to assess groundwater/surface water interactions at individual sites and system-wide.
- Practical methods and case studies that link water plans and flow allocations with catchment and land-use plans – this work needs to extend to estuaries.
- Proven methods to support community engagement and participation in planning and management of environmental water (leading to greater public support and funding for both R&D and plans).
- Understanding about the impacts of potential future climate change on aquatic ecosystems and potential management responses. This then needs to inform strategies to amend natural flow designs so that they take account of climate change.
- Methods need to be developed that separate effects of flow on ecosystems from those of changes in land use, infrastructure (eg dams and weirs), climate, and natural variability.
- Work is required within and across regions to evaluate monitoring methods that can be used to develop guidelines highlighting which management strategies are most effective for particular purposes and situations.
- There is a need to quantify the benefits and disadvantages of flow pulses and conditions that may optimise effects, and to identify the rules/conditions required to enable managers to make further use of these techniques.
- Research is required to identify threats to aquatic refugia (eg livestock, abstraction during low flow, irrigation delivery) and the licence and flow rules that will prevent or reduce these impacts.
- Further testing of the value of a focal species approach to assist environmental water management decisions is needed.
- More work needs to focus on designing institutional and planning frameworks that support a whole-of-system approach and enable flexibility in using limited and variable water volumes.
- There is a pressing need to attend to the training needs of water managers, including: hydraulics, hydrology and flow measurement principles and measurement; aquatic ecology principles; monitoring and evaluation methods; using adaptive management; communicating with the wider community and stakeholder engagement in water planning and management.

- Facilitate more active collaborations between scientists, policy makers, managers and practitioners so that research is more focused on addressing relevant management problems.

Summary compiled by Dr Phil Price, Dr Siwan Lovett, Mr Jim Donaldson and Ms Nolani McColl