Emerging Rights and Risks in the Management of Water Quantity and Water Quality

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Summary

Using transferable water permits has been identified by economists as a necessary tool to efficiently allocate water to its highest valued use. Australian governments have seized the concept and begun to provide mechanisms that separate rights to water from land ownership and allow flexibility to trade the rights. Water trading is slowly taking shape but has been challenged regarding ownership rights and technical applications. Several key studies and projects are now testing a similar process to be used to develop ownership and incentives for diffuse water pollution. This paper analyses how rights to water quantity and water quality are emerging, the policy tools being used, and current challenges for decision makers.

Key words: Water property rights, pollution, permit trading

Introduction

Water is vital for everybody – our cities, our farmers, our industries, our nation. We can’t live without it. Australian rainfall is the most variable in the world and water is supplied differently for everyone. Most residences simply need to pay rates and turn on a tap. Farmers may need to source a permit or water allocation in a tenuous, thin water market. With most available water in populated regions now allocated, and many regions being over allocated, there is a significant body of legal, economic and environmental evidence showing increasing and competing demands may cause serious conflicts over water allocation and management in the future.

The use of tradeable permit systems has become fundamental to the allocation of water. Better defining permits to water as a property right has taken a number of evolutionary steps over the past few decades by economists who have convinced law makers and water users of the worthwhile contribution tradeable property rights can make. The following paper discusses the emergence of water rights in Australia (mostly citing policy development and issues in New South Wales and Queensland) and that having absent pollution rights, especially with diffuse water pollution sources, is mounting a serious threat to the economic and environmental value of water. The paper concludes that this problem can be improved by creating a system of better defined water property rights, by instigating diffuse water pollution rights,
and having access to a range of financial tools to support firms and individuals and the validity of the market system for these purposes.

Thirteen years ago Pigram\(^1\) noted that water policy and institutional arrangements and the separation of water quantity and quality objectives were not yet prepared for the adoption of a sophisticated and Pareto optimal market-oriented property rights system; a system where no one is made worse off by decisions relating to water still does not exist but policy and institutional arrangements to address these Pareto inefficiencies with water has improved significantly since 2000. Poorly defining rights to property can pose as a major threat to sustainable management of that property and while Australian governments attempt to redress this problem with water supply, major constraints exist to social and environmental water policy development as water scarcity increases scarcity costs, management costs and externality costs. Large gaps remain between the physical and chemical connections of water quantity and water quality objectives that are unmatched by policy linkages presenting an obvious platform for policy makers in the future.

### The Emergence Of Water Rights In Australia

#### Aboriginal Law

There is a dearth of information on pre-European Aboriginal use and management of water. Of the voluminous literature on Aboriginal land rights, the mention of water rights is virtually absent.\(^2\) Certain customs and law are apparent. Aboriginal law is a law linked to the biophysical environment, it is often spiritual and represented through what Aboriginal people call ‘dreaming stories’.\(^3\) Aboriginals still to this day use totemic species management as a way to monitor and manage their natural surroundings. Each person borne is given a totemic species, including water species, to monitor and conserve for the remainder of their lives. Aboriginal people also used highly exclusive rights over important water holes and rivers.

Discrimination between indigenous and non-indigenous water use has been identified in several ways over the last 200 years. Smith comments that certain conflicts around the 1800s, especially in the drier areas, Aboriginals were repeatedly driven away from the river frontages and lagoons. Many modern day examples see Aboriginal communities using dilapidated water holes exhausted by extensive land use and contamination by mining and urban development.\(^4\) Smith also speculates whether Aboriginal water rights may indeed go down a similar path to land rights where pastoral leases and native title have been found to coexist.\(^5\)

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Common Law Recognition Of Water Rights

In England in the early nineteenth century owners were largely free to do what they liked with their land.\textsuperscript{6} It could be said this longstanding liberty influenced a fairly relaxed platform of environmental and societal standards; now more commonly referred to as ‘duty of care’ – a standard many government agencies are keen to improve. Common law comes under pressure to solve resource scarcity problems but has issues where law can easily recognise possession and ownership as superior, but struggles to recognise moving mediums such as air, water and biodiversity. In time this has proved inadequate to deal with the interconnectedness of life and unable to deal with common property resource disputes such as water.\textsuperscript{7} This traditional view has eventually become no longer applicable to land and water management in Australia. Many environmental or resource protection schemes posses a duty of care or minimum standard where participants must meet certain standards before they can participate in the scheme. The duty of care may reflect a performance level better than required under legislation or government requirements, but reflects community expectations for environmental stewardship.

Prior to the twentieth century, upper catchment rights were such that flow downstream could not be diverted and if a large quantity of water was taken the owner had to return the quantity with the quality undiminished (concerning commercial and extraordinary uses such as irrigation and brewery industries). Before 1900 “[t]here were well-founded concerns that efforts at water supply and irrigation would be undermined by common law claims”.\textsuperscript{8} These concerns saw law passed moving control of water to the Crown to reinforce the common law view that has always held that the Crown’s interest is paramount.\textsuperscript{9} When industry greatly expanded after the Industrial Revolution common law was affected by the need to better define riparian rights such as the Water Act 1912 in NSW aiding judicial interpretation. In summary, the common law principle of riparian rights moved to a statutory framework. The State owns the water and it is allocated via administrative apportionment. Commercial and extraordinary uses are now regulated through water licences or permits.

Several cases have been instrumental in shaping this understanding of the “right” to water. They also illustrate how interpretation of those rights can change.

\textit{Thorpes Ltd v Grant Pastoral Company Pty Ltd} \textsuperscript{10} further established the superior rights of the Crown however Justice Fullagar cast doubt on earlier judgements of the ascendancy of Crown rights\textsuperscript{11} and concluded they coexisted alongside riparian rights. He argued that:

\begin{itemize}
  \item \textsuperscript{7} Ibid.
  \item \textsuperscript{8} Tan P-L, The 1\textsuperscript{st} Australasian Natural Resources Law and Policy Conference (Focus on Water), 27-28 March 2000, at 75.
  \item \textsuperscript{10} \textit{Thorpes Ltd v Grant Pastoral Company Pty Ltd} (1955) 92 CLR 317.
  \item \textsuperscript{11} See Hanson v Grassy Gully Gold Mining Co (1900) 21 LR (NSW) 271.
\end{itemize}
“The view which I am disposed to take is that the Act does not directly affect any private right but gives the Crown new rights – not riparian rights – which are superior to, and may be exercised in derogation of, private riparian rights, but that, until those new and superior rights are exercised, private rights can and do coexist with them.” 12

Van Son v Forestry Commission of NSW 13, a dispute between a riparian water user and upstream forestry entity degrading the water (discussed in more detail below regarding water quality) showed the relationship between common law riparian doctrine and statute riparian rights. This case further established the rights of a riparian owner against the Water Act 1912 and Water Administration Act 1986. The case submitted that Thorpes’ case should be followed and riparian rights do exist and can have serious connotations in relation to water laws.

A Federal Court decision in a bankruptcy matter in 1996, Roy F Griffith v Civil Aviation Authority 14, illustrates that courts tend to consider two principles concerning a blur between licences and rights:
- the context and legislation
- whether the licence is freely assignable. 15

Judgements have been based on transferability, for example taxi licences and liquor licences which are considered property, while grocers’ licences and commercial pilots’ licences are not property. Providing there are no limits to transferability (time, auction, land etc) it can be presumed “[i]n the face of such limited transferability, [as Tan has concluded with Queensland] courts will recognise water licences as statutory entitlements.” 16

Water legislation and policy recently introduced in NSW and Queensland, and discussed further below, has significantly transformed this situation and there now exists a statutory, transferable right to water. It remains to be seen whether common law remedies can be increasingly marginalised by better law and policy making, or, there is the possibility disputes will emerge over allocation and also quality of water and the courts may need to play a more significant role in water management.

Government departments have been active in the education role holding workshops and providing information regarding legal implications concerning taxes, wills and mortgages. There have been some disputes during the selling of land where water has not been properly specified but these disputes have not yet made the courts. 17 Other communities are concerned about the impacts of water trading to their communities such as those cited on the Murray River where high prices tempt farmers to sell water rights and leave the community. Professor Mike Young comments that such property owners, or more correctly, water owners, are able to exit the farming industry with dignity, that they have enough money to go and do something else, often in the same

12 Thorpes Ltd v Grant Pastoral Company Pty Ltd (1955) 92 CLR 317.
16 ibid.
17 Personal communications, Department of Natural Resources, Mines and Water, August 2006.
district, sometimes elsewhere, and that this is a part of the ongoing structural adjustment processes for rural Australia.18

The Current Era

Most jurisdictions in Australia allocate water by an intricate entitlement system of water allocation rights, or certain riparian and farm dam rights. Embargoes on the issuing of new water allocations has been introduced in many regions across Australia attempting to curb a chronic over-allocation of water rights. New users can only gain access to this water through the purchase or leasing of entitlements from existing users. Markets to trade water where it can be bought or leased to expand operations or sold when not needed is possible where it has been separated from the land title.

The following discusses the clarity of the property rights regime, necessary ingredients for property rights, law and policy tools used to establish tradeable permit schemes and challenges at the common law level. Several distinct phases of water property rights have emerged through time: from non-existence, to a common law propriety right and to a fully-unbundled, well specified, secure, Torrens based, but restricted statute based, water entitlement. There is ongoing pressure from resource economists19 to proceed to full transferable water rights in a tradeable market and, while Australian jurisdictions appear to be moving towards a system of property rights within a heavily regulated framework, many challenges and constraints exist affecting decision making. The Organisation for Economic Cooperation and Development (OECD) suggests this is common around the world and water use is less amenable to tradeable systems due to:

- Higher transaction / transportation costs
- Limits on direction of trade (ie downstream)
- Limits on market size (often restricted to one water body or catchment), and
- Increased importance of time and place of use or concentration of emissions.

Also of concern for governments is compensation for future attenuation of rights in pursuit of other societal or environmental objectives which could be a barrier to the adoption of a strongly non-attenuated property rights structure (for example, more water for the environment or communities that have been highly impacted from a loss of water rights and therefore flow on business). The situation is certainly challenging but many authoritative bodies pursuing water market mechanisms are proceeding with confidence in the structures they design and early results are encouraging them to progress further down this path.

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18 Australian Broadcasting Corporation, TV program transcription: http://www.abc.net.au/7.30/content/2006/s1744867.htm Broadcast: 19/09/2006 High prices tempt farmers to sell water rights
Is the right to use water a property right?

“Concepts of property and property rights are not fixed and immutable, but can change form one society to another, one political ideology to another and one time period to another.” Over time ownership rights to intangible things such as forests, biodiversity and water has seen many different hues such as a Kings Forest in the United Kingdom, trout steams in medieval Europe and water law today.

Generally, current water management structures treat water resources in the same way as a true public good which can be used to express the rights of individuals not to be excluded from natural amenities such as water, air, natural beauty, peace and cultural heritage. However, exclusive rights also exist where water law has evolved in Australia to an extent such that certain elements of this public good commonality have been made exclusive and only obtained by private, commercial arrangements. This array of ownership and rights is not without ambiguity or inefficiencies: the environment is not getting the water it needs in many water basins and some commentators would like to see more substantive moves by governments under scarce conditions where water that is now being defined as a secure, excludable compensatable right similar to land ownership where, generally, compulsory government acquisition receives appropriate compensation. Or, governments can participate in constructive water rights buyouts in dry and environmentally impacted basins. Economists have critiqued this outcome identifying a number of impediments to water trade that are reducing efficiency and should be removed. These include: allowing other participants to trade in water markets; opening trading between districts, removing harmful pricing schemes, and improving the transparency of rules and approval processes.

Market-based property rights systems – which embodies exclusive and tradeable entitlements – are being used in the management of a range of natural resources such as fisheries, forests, wildlife, and water and also in the control of environmental externalities such as pollution. It is argued that well-defined and transferable property rights provides an incentive for individuals and firms to use resources as efficiently as possible while minimising government intervention. The framework, based on neoclassical economic principles, involves setting a quota, essentially a rule that only a certain quantity can be taken or used; making the quota tradeable thereby shifting the centre of control for allocation, price setting and decision making to the firm or individual (or other units such as public utilities) and away from a governed ‘command and control regime’. If the system works well, a greater sense of ownership of resource management by industry members is achieved and maintenance of the resource occurs.

A major attraction is that ecological objectives can be achieved but also that difficult resource allocations are transferred to the market place and not the government picking winners and losers which can be highly inefficient and inequitable. Provided exclusion and enforcement of resource rights is possible, markets and prices emerge from collective economic behaviour with a certain frequency of trades and healthy

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number of buyers and sellers.\textsuperscript{21} It is envisaged that these protected or sanctioned rights will then provide incentive and restraints to use the resource well, to encourage use that will benefit the community as well as the individual. Furthermore, rights to transfer these entitlements will encourage the resource to be used by higher valued uses. That is, if rights to draw water from a river are saleable, they will be bought by those who can extract the greatest productive value from the water and sold by those who tend to gain more from sale.

**Essential Features for Water Property Rights**

A property right, as a right of ownership can be described as encompassing three main rights: the right to use the asset, the right to returns from the asset, and the rights to change the asset’s form, substance and location.\textsuperscript{22} The actual origin of water property rights depends on the hydrological cycle and its powers of supply. As long as there is no shortage, water users are happy to leave it to nature. However, as shortages and demand for water both increase, so do calls for clarified rights and the ability to transfer those rights for economic gain.\textsuperscript{23}

Ring fencing property or creating exclusivity is fundamental to establishing a rights based system used to avoid overuse and mismanagement of the property in question. A definition of property rights that is often used is one put forward by a High Court Decision in 1937 based on the principle of exclusion:

“The primordial principle which emerges from the majority of judgements…is that a resource can be propertised if it is – to use anther ugly but effective word – “excludable”. A resource is “excludable” only if it is feasible for a legal person to exercise regulatory control over the access of strangers to the various benefits inherent in the resource.”\textsuperscript{24}

In the 1990s several texts, such as Sturgess and Wright, discussed a possible water property rights regime based on a number of levels – from temporary volume transfers to the highly sophisticated level of arbitrage and ‘water futures’. To begin movement through the levels of sophistication a number of key requirements are needed such as: exclusivity, transferability, law enforcement, tenure and clearly defined rights for the entire system – from environmental rights to the actions of third parties.

**Government relations and regulatory foundations**

Robust regulatory frameworks are necessary for market-based approaches being used to manage natural resources even though much of the activity under the regulatory


\textsuperscript{24} Kevin Gray ‘Property in This Air (1991) 50 Cambridge Law Journal 252 discussing *Victoria Park Racing and Recreation Grounds Company Ltd v Taylor and others* (1937) 58 CLR 479.
instrument will be voluntary or flexible. This point is often misunderstood and the more successful market-based instruments implemented in Australia and other destinations have done so on the back of robust regulatory support. Market instruments can be used in conjunction with other policy tools and have often been built on regulatory platforms already established. In addition, more than one market instrument can be used to tackle the same environmental issue. This is very much the case with water where water pricing (pricing to cover administrative and management costs, scarcity costs and externalities) is used in conjunction with water trading.

Water resource management in Australia is constitutionally assigned to state governments. However, the impetus for water reform in the last decade has come from the Commonwealth. The Council of Australian Governments (COAG) water reform in 1994 has been the fundamental stimulus of reform and the emergence of the property rights issue. In 1994, COAG adopted a strategic framework for reforming the management and use of water in Australia. Point 4 of the COAG Communique stated that governments would implement systems of allocations or entitlements backed by the separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and if appropriate, quality. The federal government were to make a series of payments totalling $4.2 billion to the states and territories over the period from 1997 to 2006. These payments are conditional on reforms to a number of industries, including the water industry.

In 2000 NSW and Queensland finally started passing laws separating rights to water from land. These laws instituted a statutory, transferable right to water and enshrines for the first time the need for human and natural processes. Through the Water Act 2000 (Qld) and water resource plans, and the Water Management Act 2000 (NSW) and Management Plans, governments are aiming to strike the correct balance between water users, future generations and the environment.

Establishing market mechanisms for water is not simple and is likely to take some time to emerge to their full potential. Comprehensive institutional frameworks have been put in place ushering in new environmental market and ecosystem service concepts where only six years ago the concept of a water property right was described as mythical and analogous to the Australian legend on ‘Bunyips’ – we have all heard of one but never seen one. Water property rights has since been better defined by these laws but the work has some way to go especially with environmental rights which remain inadequate in volume, temporal, spatial, quality and quantity terms especially in certain catchments such as the heavily impacted Murray-Darling River where more substantive undertakings are required.

Trade in Water

Using markets as a means of allocating natural resources stems largely from the assumption that a market will approximate the competitive ideal – finding appropriate prices and quantities for a scarce resource. A variety of tradeable water systems have emerged around the world, built on the standard property right criteria discussed above – scarcity, exclusivity, compensatable right, regulatory backing. The fundamental policy task is that water entitlements are assigned a legal property status, vested in the individual and negotiable independently of the land. It is hoped this legal alteration can accomplish a wide range of environmental, social, and economic objectives in a cost-effective manner. Whether these objectives are met or not depends, amongst other things, on the design of the market and the ability for government policy to supplant identified market failure. Prior to 2000, many commentators believed water markets suffered from considerable social pressures and political expediency constraining the full operation of water markets. The move to a market-based water allocation system in Australia has been slow and immersed in political and practical problems because of the difficulty in defining property rights. Careful, community based planning stemming from natural resource groups is now more the norm relying on a comprehensive range of technical detail supplied from various quarters including government agencies, interest groups, community groups, industry and universities.

NSW (Water Act 1912; Water Management Act 2000) and Queensland (Water Act 2000) provide for example a system of tradeable resource rights in water (other states and territories have also instituted property rights but have not be reviewed for this paper) and these Acts are designed to advance sustainable management of water using relevant planning instruments such as Water Resource Plans in Queensland. Under the Act, such plans are envisaged to set ‘environmental flow objectives’ for the protection of the health of natural ecosystems for the achievement of ecological outcomes. A second planning system, Resource Operations Plans establish tradeable water entitlements. NSW uses one plan called Land and Water Management Plans. Such rules include for example how often rice planting can take place, has references to water quality and to formal environmental reviews under certain circumstances.

The granting of new water entitlements in Queensland consists of various applications under the Water Act:

- Stock and domestic use
- Downstream locations
- Mining tenure
- Local governments and the State
- Previous licences
- Other applications for or about a water licence
- Cultural uses by Aboriginal or Torres Strait Islanders, and natural systems.

Water allocation specifications are granted using a host terms such as:

- A nominal volume
- A volumetric limit
- A maximum rate that the water may be taken at

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- A location which identifies the zone from which water can be taken
- A purpose for the use of the water taken under the allocation; and
- A passing flow condition

The basic approach is for water users to buy water from the ‘market’, not the water plans managed by government. Property specific land and water plans then need to be drawn up before the water is used. These plans can also be used to help reduce sediment runoff and enhance water quality through best practice irrigation techniques and retaining riparian vegetation. Success for this segment of the management plan is yet to be documented and is ‘soft’ law at best.

Water transactions proceed via certain restrictions. State authority must approve transactions once certain conditions are met and transactions can be rejected if it is judged there is a negative externality caused by the trade (example, salinity or water quality problems). Current embargoes and caps in certain over-allocated basins necessitate that new diversions must be met through the water trading system.

Robinson and Ryan\textsuperscript{29} list a number of legal, scientific difficulties this type of market has yet to deal with:

(1) the science used has a significant degree of uncertainty due, in part, to the variability of Australia’s climate. This creates problems in over-allocated systems where scientific information is required to justify a reduction in water entitlements. The reductions in allocations may be challenged in court and lead to expensive and lengthy scientific debate. Scientific uncertainty can also be a problem in under-allocated systems as there is a temptation to sell or auction off the remaining water allocations, leaving little scope for revising the Environmental Flow Objectives upward in the light of future science. Once property rights are granted in water they are difficult and expensive to ‘claw back’, requiring revisions of water resource plans, which are to be reviewed every 10 years.

(2) the Act provides for Environmental Flow Objectives for “the achievement of ecological outcomes”, broadly defined as “a consequence for an ecosystem in its component parts specified for aquifers, drainage basins, catchments, subcatchments and watercourses”. The Water Resources (Boyne River Basin) Plan 2000 includes the following ecological outcome “River flows are to be managed … to allow for an increase in the frequency and duration of marine conditions in the estuarine reach downstream of Awoonga Dam leading to a shift towards plant species that tolerate the increase”. This however is arguably a negative outcome and there is some evidence that limits have been set beyond the Environmental Flow Objectives.

(3) the decision whether or not to trade in entitlements is largely an economic question for the water user. Queensland currently has 6 water basins out of a possible 23 trading water. Robinson remarks that there may be reluctance to trade because revenue received from the sale would not offset the risk of having insufficient water if rainfall was low or if the seller changed their crops in the future.

\textsuperscript{29} Robinson R and Ryan S, A Review of Economic Instruments for Environmental Management in Queensland, CRC for Coastal Zone, Estuary and Waterway Management, June 2002
The Council of Australian Governments (COAG) launched the National Water Initiative (NWI) in 2004 aimed at pursuing greater compatibility and the adoption of best-practice approaches to water management nationally in a range of areas. It is hoped the NWI will result in, amongst other matters:

- expansion of permanent trade in water bringing about more profitable use of water and more cost effective and flexible recovery of water to achieve environmental outcomes;
- more confidence for those investing in the water industry due to more secure water access entitlements, better and more compatible registry arrangements, better monitoring, reporting and accounting of water use, and improved public access to information;
- more sophisticated, transparent and comprehensive water planning that deals with key issues such as the major interception of water, the interaction between surface and groundwater systems, and the provision of water to meet specific environmental outcomes;
- a commitment to addressing over-allocated systems as quickly as possible, in consultation with affected stakeholders, addressing significant adjustment issues where appropriate; and
- better and more efficient management of water in urban environments, for example through the increased use of recycled water and stormwater.

COAG have acknowledged that good progress is being made in water reform but a number of issues need to be addressed to speed up the process: 1) uncertainty over the long-term access to water is still hampering investments in higher valued and more efficient production systems; 2) current water market arrangements are preventing markets from reaching their full potential; and 3) significant concerns with securing environmental flows and adaptive management systems to ensure the health of riverine systems.

A compensatable tradeable water property rights system has also been established but only when certain allocations are changed after certain statutory reviews over long periods of time. That is, it is not very comprehensive or amenable to a system based on the whims of nature. This means the range of possible changes to volume and entitlement is open to risk and inefficiencies. Other institutional elements are also yet to emerge such as technologies to measure precise water quantities and appropriate clearing houses or brokers to facilitate trading.

The Productivity Commission released a discussion document in June 2006 researching ways to assist Australian governments meet their commitments under the NWI in relation to water markets and trading. Several of the main findings include: 30

- Markets are already making a significant contribution to increasing rural water-use efficiency. But further reform is needed to ensure that water continually moves to its highest value uses (including environmental uses).
- Market mechanisms to address environmental externalities need to be targeted to location and scale — no ‘one size’ fits all. Poorly designed programs can impose high costs that may outweigh potential gains.

- Appropriate arrangements for environmental managers should be established as soon as is practical based on a comprehensive review of different institutional structures. They need clearly defined objectives, good coordination processes and adequate resources. They need to enter markets to source water and to access the full range of water and water-related products on the same terms and conditions as other market participants.

- The Living Murray Initiative could be implemented more effectively if current efforts to source water ‘permanently’ are supplemented with additional water products (such as seasonal allocations, leases and options contracts). Appropriate institutional arrangements should be put in place to establish an agency specifically charged with purchasing a portfolio of water products to suit the needs of environmental management in the River Murray.

- Using administrative arrangements to allocate water for environmental purposes conceals the opportunity cost of meeting environmental targets. Market mechanisms are usually a more efficient means of re-allocating resources.

- Climate change, farm dams, vegetation and land-use changes, groundwater extraction, and changes to irrigation water management, have the potential to reduce stream flows substantially. In the Murray-Darling Basin, such reductions undermine efforts to achieve environmental goals and can affect the reliability of existing entitlements. Priority should be given to refining and clarifying existing property rights, undertaking further research on water systems and improving water accounting.

- There are opportunities to improve entitlement regimes through unbundling of water entitlements and water-use approvals, and facilitating efficient intertemporal water-use decisions. Separating delivery entitlements from water entitlements may also be beneficial where there is congestion in water delivery.

- A number of impediments to water trade reduce economic efficiency and should be removed. In particular, governments should:
  - enable other participants to trade in water markets
  - open up interdistrict water entitlement trade, and remove exit fees.

The above section outlines the contribution trading can have assisting rural water-use efficiency but water market failures and indeed inappropriate trading can effect third parties concerning: volumetric reliability, delivery reliability and water quality. It will be necessary for policy makers to determine whether these impacts should be prevented and internalise the impacts with the water traders. Various options exist such as restricting trade to smaller areas to limit third part effects; compensating third parties; using fees to compensate third parties, using actions to mitigate impacts; and the use of exchange rates to adjust traded entitlements.31

**Secure water supply and risk management**

As water rights are formed under state regulation, there may be claims for compensation under state law. In 2000, the Federal Minister for Agriculture, Fisheries and Forestry, Warren Truss MP, thought it was simply down to morals:

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“I have no hesitation in supporting the view that any landholder whose rights are restricted or removed has a clear moral right to compensation, even if some of the states might argue they don’t have a legal obligation.”

Moral jurisdiction in this case would however only apply to states and territories and not the Federal Government.

Long-term specification of property rights to water of 10 or more years is provided for but uncertainties regarding climatic conditions, future expansion of industry, environmental requirements and other resource functions, can all place differing risks on water entitlements and either add or detract value from water.

“Assigning even a notional reliability factor to water entitlements is a tentative step forward in the specification of property rights to water.”

Allowing transferability on top of this the market then at least has some idea of the status of what is being traded; the extreme being full property rights. For a perfect market though, fully specified property rights would be necessary and provide confidence to farmers and irrigators that a water entitlement is a stable quantity. Is this a contradiction in arid Australia? “[C]ertainty is unattainable when set against the inherent variability of water supply.”

It is important to note that compensation is only payable in Queensland if the Water Resource Plan is amended during its 10 year life and if the amendment results in a reduction of the value of a water allocation.

A fundamental criterion when allocating water to prospective users is to deal with water quality and water flows for the environment first and allocate what’s left. Water Quality Objectives and Water Flow Objectives are instrumental to this task – where they have been established. This task is easier when supply and quality is not much of a problem but has presented problems for over-allocated areas such as the Murray-Darling Basin.

So what is guaranteed? An example is a farmer having a nominal 1,000 ML allocation for 85 out of 100 years. Certain sectors of the economy such as cotton growers are very competent with these terms and implement good risk management systems. The volume allocated can be traded, leased and so forth depending on what owners have decided for their water. More and more products are emerging to manage water quantity risk such as: sell and buy options, futures markets, leasing, temporary and permanent trading instruments, insurance, and weather derivatives.

Water continues to be vested in the state. Entities purchase a right to a volume and reliability over time to use that water at a particular place. The ‘right’ is a right to access a share of a proportion of water available. In the end, this is an actual volume, but not referred to as a specific volume; it is a ‘right to access’. That access is nominal and determined annually. For example, one year a farmer may get 50% of the annual allocation, the next year might be 90%.

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34 Ibid.
One of the ways to decrease proprietary risk is by purchasing ‘high priority’ water. For example, mines often purchase water physically – say a 20 year allocation of a certain volume from a utility; direct from a dam (example, Sunwater in Queensland). The utility receives elevated prices and bears some risk of being in a position to ensure a supply of water. If there was a severe drought the farmers downstream would have their taps turned off before the mines as the mines have purchased high priority water, against medium priority for agriculture. Supply risks are also borne by the mine depending on the nature of the contract which will no doubt be using “Act of God” clauses. These groups generally are highly knowledgeable about the reliability of water variability and negotiate contracts accordingly.

Drinking water and mining in Australia are typically high priority water. This means the water is more secured and attracts higher relative fees and charges (but it is important to point out water pricing does not properly consider externalities or scarcity). There still remains environmental and commercial risks with a system that reviews in 10 year brackets and then only compensates on changes to that 10 year allocation. It is incumbent for water owners to finance supply security and by adequately using insurance or financial risk tools critical to a water rights system being a complete, fully valued asset.

Many advocate the repurchase of water rights from irrigators where there is a need to meet environmental objectives. Salinity and water related problems of land and water management constitute one of the biggest environmental problems facing Australia. Economic costs associated with salinity may be as much as $350 million per year when forgone opportunities in agriculture are taken into account. Environmental flows are only done every 10 years so a lot of work needs to go into getting this right. The Murray Basins show that water is over-allocated and other measures such as buy backs are requiring consideration especially with the onset of climate change adjustments. Quiggin believes that water policy is being radically constrained by the refusal of most governments to accept the need to repurchase water rights from irrigators where there is a need to meet environmental objectives. It is clear environmental contingency allocations will need to become a more significant part of water trade policy in the future based on a compromise between these competing interests.

The legislative framework that has developed over the past six years has made it possible for water users to buy water to expand their operations and sell any they do not need. Secure entitlements to water by governments is prescribed, but supply variability is strenuously defended. Some players in the market, such as irrigators, see this as not being fully conducive to the market system. Others say this is what nature decrees and should be reflected in supply being assured by agencies. This opens the opportunity for separate financial instruments to be used more to mitigate financial risk such as insurance, futures or other tradeable instruments that embody concepts like ‘exchange rates’.

The threat of water quality and poorly defined pollution rights

It is widely recognised that diffuse water pollution now accounts for a significant proportion of the pollutant load in Australian waterways. This section of the paper reviews the status of diffuse water pollution highlighting efforts by scientists, government agencies and others to develop water pollution law and policy in the face of very high uncertainty and financial constraints.

In the past, the legal system has forced a preponderance of resources into the control of point-source pollution. However, a large proportion of the contaminated load to surface and ground waters comes from the land around these waters (example, farms and city streets), rather than specific point sources.\textsuperscript{36} Growing scientific data showing a significant proportion of pollution coming from diffuse sources, changes in risk assessment paradigms and an increased catchment focus is driving very different responses from water managers than the status quo.

Background and nature of diffuse water pollution

Environmental protection law typically provides a long and broad definition of water pollution which would include diffuse sources but often does not provide specific mention of diffuse water pollution. Basically, any matter going into water is pollution. Diffuse water pollution occurs from discharges without a single point of origin. These discharges can be polluted surface runoff waters flowing into waterways (mainly during wet weather), seepage from groundwater or small discharges from a large number of sources resulting in cumulative impacts (example, discharges from vessels). Diffuse sources are difficult to deal with through regulatory approaches because they cannot be readily identified and measured.\textsuperscript{37} Not only is the distinction between point and diffuse pollution often blurred, there are ‘endemic problems for environmental law about the identification of sources of pollution, and the identification of the standards appropriate for the environment into which these polluting materials are released.’\textsuperscript{38}

Sources of diffuse-source pollution

Sources of diffuse water pollution include agricultural runoff, erosion, industrial discharge, urban stormwater, and disturbed lands such as mines and quarries. The United States Environmental Protection Agency provides a comprehensive description of diffuse water pollution:

‘Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. [Diffuse water pollution] is caused by


\textsuperscript{37} Adapted from Fisher D, Water Law, LBC Information Services, Sydney, 2000; Bates G and Lipman Z, Corporate Liability for Pollution, LBC Information Services, Sydney, 1998; and Thornton J, Rast W, Holland M, Jolankai G, and Ryding S (1999), \textit{Assessment and Control of Nonpoint source Pollution of Aquatic Ecosystems}, UNESCO.

\textsuperscript{38} Fisher D, Water Law, LBC Information Services, Sydney, 2000, p. 266.
rainfall or snowmelt moving over and through the ground. As the runoff moves after rainfall, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas
- Oil, grease, and toxic chemicals from urban runoff and energy production
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks
- Salt from irrigation practices and acid drainage from abandoned mines
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

Why has diffuse pollution become a problem?

Several significant events over the past decade have influenced the focus in Australia on the management of diffuse source water pollution. These include: the Wallis Lake oyster pollution incident; the Sydney Water Crisis; the Health Rivers Commission Inquiry into the Hawkesbury-Nepean; the South East Queensland Water Quality Management Strategy, Great Barrier Reef Water Quality Protection Plan, ongoing community and government concern about algal blooms and other perceived water quantity and quality problems. It is a widespread problem: ‘there is little disagreement that nonpoint source pollution is a major cause of water quality degradation on a global scale.’ The pressures outlined above have resulted in blue-green algal blooms and excessive plant growth, eroded river banks, impacts to human health, reduced river flows for aquatic ecosystems, and decreased populations of fish and other in-stream species in the catchment.

All Australian governments have underway a number of programs to address diffuse water pollution issues, including stormwater management, sewer overflows and irrigation area licensing, state forestry licensing and a range of cleaner production, education and community development initiatives. State government environmental authorities have recourse to licensing requirements, ecological provisions stipulated in laws and operational policies, regulation through notices, criminal law, and environmental audits. Strikingly, virtually all diffuse sources can escape these tools. There are some tools and programs being applied to diffuse water pollution directly (eg. acid sulfate soils) or indirectly via stormwater management or by a planning framework in which diffuse water pollution is considered but this application can be classified as relatively soft and ineffectual.

While knowledge of diffuse water pollution has greatly increased, it still hasn’t reached the critical level needed to overcome the current focus on point source pollution. The added difficulty of assessing risks to formulate policy has resulted in weak institutional responses. Thorton et al make note of three predominant factors underlying the problem of diffuse-source pollution: (1) lack of basic knowledge and understanding of the extent of diffuse-source pollution, (2) lack of knowledge and experience regarding the multidisciplinary and multi-institutional approach necessary

39 www.epa.gov/owow/nps/qa.html
to solve diffuse-source pollution, and (3) that diffuse-source pollution closely links
human based activities to the environmental mediums and character of the
catchment.\textsuperscript{41}

**Do the courts recognise diffuse pollution?**

As discussed above, while common law recognises possession and ownership as
superior, it struggles to recognise moving mediums such as air, water and
biodiversity. This has shown to be inadequate to deal with the interconnectedness of
modern life and unable to deal with common property resources such as water.\textsuperscript{42} This
traditional view has eventually failed to apply to water protection and a number of
statutory measures have been instigated, although directed at point sources as
discussed.

Common law has gone to some lengths to allow people sovereignty over their land,
to chose what they do with and on it, but also to protect the rights of others that the
former may interfere with.\textsuperscript{43} Most diffuse water pollution conflicts are incompatible
with the adversarial legal system that appreciates clearly defined problems between
parties that are easily identified. The multiplicity of diffuse sources makes this a
fraught process asking for much greater input and clarity from processes of science
and the processes of law. Further, identifying and measuring the impacts of pollution
can be very difficult; especially diffuse pollution and impact comparisons with point
sources. The basic concept to calculate harm is that: if a person’s water rights are
interfered with in respect to quality or quantity then retribution can be sought. As the
following discussion reveals, this concept has played an important role in
contemporary environmental law and has expanded into fields such as product
liability; especially when the product (example, oysters) comes from the
environment. The threat of this occurring on a more frequent level is increasing as
reports on diffuse pollution worsen (for example, see Reef Water Quality Protection
Plan, South East Queensland Healthy Waterways Water Quality Management
Strategy).

**Vanson v Forestry Commission**

In *Van Son v Forestry Commission*\textsuperscript{44} Cohen J held the Forestry Commission liable to
a downstream landowner for siltation caused by logging operations which
detrimentally affected the quality of the water lawfully used by the plaintiff for
domestic purposes.\textsuperscript{45} The licence conditions provided by the EPA were found to be
adequate for aquatic life but were not good enough for Van Son’s domestic purposes.
Thus, common law rights survived administrative license rights determined by a
government agency. Justice Cohen found that riparian owners had retained their
residual common law right to water for domestic purposes that was not significantly

\textsuperscript{41} Thornton J, Rast W, Holland M, Jolankai G, and Ryding S (1999), *Assessment and Control of
Nonpoint source Pollution of Aquatic Ecosystems*, UNESCO, p. 2.
\textsuperscript{42} Ramsay R and Rowe G, *Environmental Law and Policy in Australia*, Butterworths, Sydney, 1995,
at 123.
\textsuperscript{44} (1995) 86 LGERA 108.
\textsuperscript{45} Bates G and Lipman Z, *Corporate Liability for Pollution*, LBC Information Services, Sydney, 1998,
altered in terms of its character or quality, despite the enactment of the Water Act 1912 and the Water Administration Act 1986.46

Common law rights to water are now modified by statutes, such that all significant abstractions of water are controlled under licence from the Crown.47 Riparian land owners continue to have a property right to use water in NSW for example, however this is restricted to the rights of occupiers of riparian land as defined in s.7 of the Water Act. The right to take and use water is now covered by the Water Act, but water quality is still protected under the common law doctrine.

Although not used in this case, environmental nuisance is another legal tool that may be increasingly used during diffuse water pollution disputes. Nuisance, can occur when an emission can interfere with a person’s enjoyment of the environment or an environmental value caused by noise, dust, fumes, smoke, odour or light; or an unhealthy, offensive or unsightly condition because of pollution or contamination; or some other prescribed manner.48

In time, it is likely there will be more of these type of cases going to trial. A gap has emerged between the pace of progress and development and the law used to control it. Emerging scientific data is becoming very robust at identifying the number of dischargers (industry, water treatment plants, agriculture, runoff from communities) that create an environmental problem and infringe upon a persons rights. Better science will continue to test this gap. The outcome for the governments is the need to research appropriate institutional mechanisms to effectively handle multi-agency concerns – tools that can manage both development and environmental protection together.

Can a form of trading or property right be used?

Having some sort of emissions trading or offsets is increasingly being proposed as one means to improve management of diffuse pollution. The trading concept is being used and tested widely around the world,49 particularly with point sources but is yet to be seriously progressed anywhere with diffuse sources.50 However research, enthusiasm and sheer necessity is driving consideration of applying economic measures to diffuse pollution.

The concept of using trading or offsets to manage development pressures and environmental impacts is being considered widely across Australia. The basic idea of offset trading is that if a source wishes to either create new pollutant loads or

increase existing loads it must first offset its increase by reductions in loadings elsewhere. Examples include: developers of a new golf course might be required to fund best management practices in nearby agricultural areas in addition to on-site best management practices; or a new housing development might only be approved if, as part of the development, convert septic tanks in an existing development to an improved sewered system.

Trading or offset programs can be established so that development has no net environmental impacts, or so that development leads to net environmental improvements. It is possible to require an offset ratio greater than one, so that sources have to more than offset their planned increase in loadings. This can be used to achieve additional environmental improvements and to hedge against any uncertainties regarding water quality impacts.

Offset contracts can be implemented via bilateral negotiations between stakeholders (that is, where developers directly contract with owners of potential mitigation sites), or through privately or publicly owned offset banks. An offset bank is not a bank in the usual sense. Rather it involves the completion of one or more projects in which environmental remediation works are undertaken. By completing these works, offset banks earn “credits” which can then be sold to developers who are creating net-impacts on environmental quality.

In 2001, there were estimated to be over 200 operational wetland mitigation banks in the USA, and over 100 awaiting regulatory approval. The advantage of either setting up a private or a government program to oversee implementation of offsets is that it would greatly reduce the transaction costs of using offsets. It has been found that increasing transaction costs will reduce the propensity of sources to use incentive programs such as offset banking.

Generally, a scheme that provides and institutes a requirement for incremental nutrient impacts associated with new developments to be offset could be placed under planning and pollution control statutes. Provisions would stipulate new developments or industries that would need to seek pollution credits for their scheme if their emissions were expected to exceed a nominated threshold. A scheme could also be applied in this way to areas where more stringent water quality goals are to be instituted and requires a number of sources to contribute to an overall emissions reduction.

Offset schemes such as this have been developed internationally and trialled on the Hawkesbury-Nepean in NSW and Busselton in Western Australia. In addition, offset banking is proposed under new native vegetation clearing legislation in both NSW and Victoria, while Melbourne Water has recently announced a stormwater quality offset scheme. Queensland is currently investigating environmental offsets under a range of scenarios.

Rolfe and Windle recently completed a major study on the use of these instruments for diffuse sources in the Lower Fitzroy in Queensland. Perhaps the single biggest conclusion of this work was that there is plenty of opportunity to trade between
diffuse agriculture sources in the region but the imposition of a cap on this specific group is politically and practically unrealistic.51

Many issues need to be researched:

- What part of catchments should be targeted?
- What discharges and sources should be covered to elicit the most feasible offsets?
- How do we ensure ‘environmental equivalence’ or ‘like-for-like’ offsets?
- Identifying the form of pollutant discharged - the tradeable instrument, and
- The allocation of allowances.

Conclusion

With increasing pressure on water resource management in Australia, the use of property rights as a management tool is increasingly being demanded. Current policy and institutional arrangements stem from water scarcity and common law approaches to water quality and quantity conflict resolution. Centuries ago, the tragedy of the commons was understood as an environmental outcome that results from an inadequate specification of property rights to natural resources. This adage is as true today with water resource management continuing to suffer in some cases from poorly defining rights to water quantity but more so to water quality. This paper submits this poses a major constraint to water policy development.

The paper discussed the emergence of water property rights in Australia and where ambiguity or policy and institutional gaps remain obstacles to meeting the full potential of a market-based approach for water management. How clear can water rights be under a system that requires necessary attenuation during dry times? Is there a right to a certain degree of water quality and how does this relate to a lack of rights on water pollution? There is no doubt greater clarity is required on these issues and water rights and management of diffuse pollution could be considerably improved by a tradeable permit or offset system.

To sum, designing tradeable permit systems for water comes with its challenges and many competitive characteristics of a market are currently not present in the market for water and pollution entitlements. If authorities carefully design the market, setting the rules and facilitating low cost exchange, some of these challenges could be mitigated.

51 Rolfe, Establishing the Potential for Offset Trading in the Lower Fitzroy River research reports, Final report for MBI project 53, Research report no. 6, June 2005.
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