



A TALE OF TWO SYSTEMS: CONFLICT, LAW AND THE DEVELOPMENT OF WATER ALLOCATION IN TWO COMMON LAW JURISDICTIONS*

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This paper examines how the law governing water has evolved in the United States and Australia. The evolution of water law in these jurisdictions demonstrates that the ‘scientific modernism’ that prioritises economics and hydrology as the pivots around which water institutions are designed may be an incomplete model. From the history we recount, we suggest that, ranking equally with these considerations in shaping water law and policy, is the broader framework of laws and institutions, and legal culture within a society. These factors shape the types of solutions to conflicts in a society and determine, to a substantial degree, the solutions to water conflicts that become law, which then in part determine future legal solutions.

This observation is of more than theoretical importance. Towards the end of this paper we consider the latest water modernist experiment, the Australian Water Act. We suggest that closer attention to social factors and legal traditions would have resulted in a more effective law. We believe this holds important lessons for water policy generally.

Introduction

Under English common law, surface water access was traditionally conditional on ownership of the land bordering the water source and access carried a legal responsibility to downstream users. The management of allocation and contamination was principally a common law issue between neighbours. This is now far from the universal principle in Australia or the United States. Water allocation is now managed through complex government-led administrative allocation, with roles for private negotiation or trade through markets and it involves only residual use of civil action (such as nuisance).

These changes, which in hindsight are radical, did not arrive fully formed as products of hydrologic, economic or ecological design. Conflict resolution within the context of legal structures derived from earlier non-water conflict played a substantial part in driving the evolution of water rules.

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Modern water policy suggests that hydrology, economics and water-specialist institutions do (and should) drive water law and policy. The modernist approach to water law and policy seems to discount the institutional and historical background against which water policy is largely painted. Our examination suggests that many fundamental choices derive from responses to constitutional and other institutional structures that have no necessary reference to water. Conflict management patterns reflect broader norms and rules, and these norms and rules set the archetype for all conflicts that subsequently emerge, including those over water. Neither economics/hydrology nor law/politics alone can explain the current state of water laws in either jurisdiction.

The literature of institutional path dependence is relevant to the study of water law and management.¹ The architecture of the legal system constrains likely responses to water issues. In addition, the political economy features in how water issues have been resolved historically. This suggests that contemporary water policy analysis may be under-informed by humanist, political and legal principles.

We will describe key steps in the evolution of water law in two common law jurisdictions and consider explanations for the different structural outcomes that have emerged. We do not intend to discount the importance of the economic and hydrological rationale for these developments, but we suggest that such a rationale is insufficient unless married to a more humanist and institutional approach to conflict.

Are social and institutional factors critical?

The distinct nature of water law in the eastern and western United States, and Australia is in part a reflection of their biophysical and social contexts. In the eastern United States, annual rainfall averages more than 100 cm (40 in). In the western United States, annual rainfall averages are far less, around 37 cm (14 in) annually. Australian rainfall varies between 10 to 120 cm (4 to 47 in) across a broad range of climatic types, but with the large part of the country experiencing conditions that are comparable to the western United States. The national average, including the wet tropics, is around 50 cm (20 in). In drier states in both countries, water law has responded to scarcity but the legal forms of response to conflict caused by scarcity differ between states. The sources of the differences include constitutional structures, established legal norms arising largely from non-water conflicts and political philosophy at the time the issues emerged.

We begin this discussion in Australia, to which we will return at the end of the paper. From Federation in 1901, Australia moved progressively from a civil riparian system through a government planning and allocation system (with water licences attached to land) to the current system of tradeable extraction entitlements untied to land. Water is now legally vested in governments but its allocation largely occurs through tradeable rights to extract. Australia has taken the bold step of fully separating rights to extract water from ownership of land and does not require demonstration of beneficial use. Water entitlements can be freely bought and sold. The interests of the environment are managed through an allocation of available water that treats the environment as an extraction rights holder.

By contrast, in the wetter eastern half of the United States, states have maintained more traditional water law systems, such as common law riparian rules and the more recent concept of regulated riparian rules—each of these rules will be discussed below—while some drier states have moved to composites of market and government allocation in the prior appropriation system—also to be discussed below. This differentiation of ‘solutions’, even when hydrologic and economic contexts seem comparable across states, begs the question: why can the separation of

¹ For an examination of this phenomenon and its policy implications, see, Jane Marceau, Karen Manley and Derek Sicklen, *The High Road or the Low Road: Alternatives for Australia's Future* (Australian Business Foundation Limited, 1997); or, in a legal context, see, David Driessen, *The Economic Dynamics of Environmental Law* (MST Press, 2003).



water rights from land ownership or from beneficial use to permit ‘pure market’ trading be the right solution in one developed western liberal democratic jurisdiction but not in another; or (if the Australian solution is the correct prescription for all systems) why can it be legally and politically feasible in one jurisdiction but not the other?

One might suggest that the rationale for the difference in legal treatment is the availability of water. The Australian experience is informed by chronic water shortages and disputes over allocation. Chronic water shortages have not historically characterized the experience in the eastern United States (though, allocation disputes are increasing) but intense water conflict and dry conditions are chronic in large parts of the western United States, in common with large parts of Australia. If an economic/hydrologic justification for the differences in legal arrangements were a sufficient explanation, one would expect that (either) the drier parts of the United States would have a system closely akin to that prevailing in Australia, or the wetter parts of Australia would retain an approach close to that pertaining in the eastern United States. However the legal arrangements vary significantly.

This suggests that some factor such as ‘politics’ or ‘law’ is needed to help explain outcomes that are not fully explicable by water availability or economic argument. Water consumption is not merely a hydrologic and economic activity. Consumption of water, and how this consumption is managed, is an artifact of how society collectively goes about the messy business of harvesting, storing and allocating vital but scarce resources. Conflict is part of this; and a role of law is to harness the vitality of conflict to shape methods of resolution, allowing the society to maintain its system resilience and coherence.² The dynamic of conflict is an important factor in its own right in shaping water laws and institutions.

Foundations of water rights

Traditionally, water’s nature as a ‘moveable, wandering, constantly changing thing’ lent credence to the doctrine that rights in water must remain common by the law of nature.³ Water is a corporeal interest available to the public, subject to a qualified property or title during use. Title subsists only during use, as water cannot be possessed or appropriated—unlike land.⁴ The greatest entitlement that a user of water could have was merely a usufruct.⁵

Water rights were vested in the unorganized public at large.⁶ It is well settled that water flowing in a stream is *publici juris*. Under Roman law,⁷ running water was considered to be *res communes*, ‘the property which belongs to no person, but to the use of all’. After water has been made subject to private uses it becomes *publici juris* by the act of relinquishment.⁸

The dynamic nature of water posed challenges to its ‘propertisation’. The realisation that water is a finite natural resource, together with the energy of private entrepreneurs and policy makers who were keen to encourage economic growth, triggered a maturing sophistry in water law. The patterns of the rights that emerged reflected the forces of supply and demand, but also the *zeitgeist* of society, different legal and political traditions, and the times. Social and political factors interacted with hydrology and economics to generate increasingly differentiated property arrangements in the English colonies. The legal diversification in water was only one aspect of the diversification of legal systems generally as states asserted their legal independence from

² N Luhmann, *Social Systems* (Stanford University Press, 1984).

³ J S Getzler, *A History of Water Rights at Common Law* (Oxford University Press, 2006) 275.

⁴ Ibid 154, summarizing the essence of Blackstone’s water doctrine.

⁵ Ibid 275.

⁶ See C M Rose, ‘The Comedy of the Commons: Commerce, Custom and Inherently Public Property’ (1986) 53 *University of Chicago Law Review* 711.

⁷ See Justinian, *Institutes* 2.1: ‘These things are the communal property of all by natural law: air and flowing water’ (*naturali iure communia sunt omnium haec: aer at aqua proflueas*).

⁸ Getzler, above n 4, 226, citing *Liggins v Inge* (1831) 7 Bing. 682, 692-3; 131 ER 263, 268.



the British Crown, and as their courts began to depart from the practice of cross-citing precedent from their parent or sibling courts.

Competing demands for water and the economic and political arguments for certainty saw the emergence of a priority for riparian owners of land. Water became an appurtenant to possession of an estate or interest in land abutting water. Based on *seisin* (possession of an estate in land), and subject to reasonable use, the riparian doctrine emphasises the communal rights of holders in possession of contiguous land. The doctrine was settled in the English common law in *Embrey v Owen*.⁹

A traditional riparian right permitted reasonable use of water for domestic or livestock purposes. Over time extraordinary use came to be legally acceptable provided the user did not interfere with others' rights, upstream or downstream, in more than an insignificant way.

In the eastern United States, the riparian doctrine was articulated as a communal right subject to the restraint of reasonable use that does not prejudice another. The Story doctrine¹⁰ is a 'theory of reasonable rights to the natural stream',¹¹ where 'the right of each landowner was equal to the right of every other landowner along the same body of water'.¹² What was reasonable was determined by balancing the injury to other riparian owners against the riparian owner's utility in using a shared resource.¹³ Reasonableness in this context aligns well with its application in the common law doctrine of negligence, achieving jurisprudential impetus from the 1800s onwards.

As extraction increased, the common law distinguished between surface and subsurface streams, and diffused surface water.¹⁴ The rules became sophisticated; for example, to be considered a stream, the location of the subsurface stream had to be identified.¹⁵

Evolution of riparian rights

*Tyler v Wilkinson*¹⁶ affirmed that riparian owners were entitled to have the water quality and water quantity maintained without degradation¹⁷ by other riparian owners. Uses were priori-

⁹ (1851) 6 Exch 352; 155 ER 579 (Ex).

¹⁰ Articulated by Justice Story in *Tyler v Wilkinson* (1827) 24 Fed Cas 472, 474: 'Prima facie every proprietor upon each bank of a river is entitled to the land, covered with water, in front of his bank, to the middle thread of the stream ... In virtue of this ownership he has a right to the use of the water flowing over it in its natural current, without diminution or obstruction. But, strictly speaking, he has no property in the water itself; but a simple use of it, while it passes along. The consequence of this principle is, that no proprietor has a right to use the water to the prejudice of another. It is wholly immaterial, whether the party be a proprietor above or below, in the course of the river; the right being common to all the proprietors on the river, no one has a right to diminish the quantity which [**6] will, according to the natural current, flow to a proprietor below, or to throw it back upon a proprietor above. This is the necessary result of the perfect equality of right among all the proprietors of that, which is common to all. The natural stream, existing by the county of Providence for the benefit of the land through which it flows, is an incident annexed, by operation of law, to the land itself. When I speak of this common right, I do not mean to be understood, as holding the doctrine, that there can be no diminution whatsoever, and no obstruction or impediment whatsoever, by a riparian proprietor, in the use of the water as it flows; for that would be to deny any valuable use of it. There may be, and there must be allowed of that, which is common to all, a reasonable use. The true test of the principle and extent of the use is, whether it is to the injury of the other proprietors or not. There may be a diminution in quantity, or a retardation or acceleration of the natural current indispensable for the general and valuable use of the water, perfectly consistent with the existence of the common right. The diminution, retardation, or acceleration, not positively and [**7] sensibly injurious by diminishing the value of the common right, is an implied element in the right of using the stream at all. The law here, as in many other cases, acts with a reasonable reference to public convenience and general good, and it is not betrayed into a narrow strictness, subversive of common sense, nor into an extravagant looseness, which would destroy private rights.' However it is elsewhere argued that he neither originated the concept nor did he unequivocally adopt it. See *Merritt v Parker*, (1795) 1 NJL App 460.

¹¹ Getzler, above n 4, 275.

¹² A P Morriss, 'Lessons from the Development of Western Water Law for Emerging Water Markets: Common Law vs. Central Planning' (2001) 80 *Oregon Law Review* 861, 875.

¹³ Getzler, above n 4, 276.

¹⁴ *Ibid* 296.

¹⁵ *Ibid* 300, 301, 312.

¹⁶ (1827) 24 Fed Cas 472, 474

¹⁷ Getzler, above n 4, 275.



tised, with domestic uses having the highest priority. Domestic use included use for drinking, cooking, bathing or watering of domestic livestock (often termed 'basic landholder rights' in Australia, preserving some vestiges of the riparian doctrine).

A landowner could access a defined underground stream if they could prove the location of the stream. Common law rules enabled property owners to treat diffused surface water, such as floodwaters, snow melt and storm runoff, as a common threat.¹⁸ This rule was modified to force landowners to accept the volume and natural location of diffused surface water flows, thereby preventing efforts to increase the natural flow volume or to relocate a runoff into other than a natural flow area. Each of these rules was later modified to limit a landowner's authority to acts considered reasonable, reflecting parallel developments in the common law where the test of reasonableness was evolving in relation to torts.

Traditional common law rules allowed landowners to withdraw as much groundwater from their land as they wanted, regardless of the impact on others.¹⁹ Limits to the ability to observe sub-surface water flows between cadastral boundaries and water bodies (or between water bodies) restricted the ability of the legal system to manage over-extraction. However if a landowner pumped water from a well with the intent to harm a neighbour, the malicious intent could be the basis for liability.²⁰ Later this rule was tempered to limit a landowner's withdrawal amounts to those considered to be reasonable in quantity and put to a reasonable use.²¹ Presently, many eastern states of the United States follow groundwater access rules that address reasonableness requirements, including where the withdrawn groundwater is being used, the reasonableness of the manner in which groundwater is withdrawn, the reasonableness of the impact which one landowner's withdrawal has on other users and the reasonableness of the share of groundwater that one user withdraws from a source that others also use.²²

However such principles are inevitably imprecise. In the case of Australia, as we will discuss, the transformation of the fugitive and ill-defined groundwater resource into specified tradeable rights has become essential to implement a water property right system that originally focused only on observable surface water flow.²³ This is proving to be a fundamental challenge, part of the solution being to assume hydrologic connectivity (a political choice to manage social conflict), and to define and allocate rights on this basis pending better knowledge.

Overall the common law water rules reflect the ideals of fairness and reasonableness to resolve disputes, which were increasingly prevalent during the early to mid 1800s. The principles did not emerge from a specific focus on the fairest or more efficient way of managing water, they resulted from a broader impetus towards neighbourly responsibility and a collective withdrawal from the excesses of *laissez faire*. Water law received – rather than originated – rules for managing social conflict and enjoyed the benefit of a depth of interpretative capacity in the legal system in the application of these rules.

Limitations of riparian rights

Conflict is likely when withdrawals by one or more riparian right holder prevent another from using the water he or she intended to use.²⁴ Riparian rules lack a practical mechanism that takes

¹⁸ Ibid 260.

¹⁹ 'Why Water is the New Oil', *The Weekend Australian Financial Review* (Australia), 28-29 June 2008, 32-33; see also *City of Corpus Christi v City of Pleasanton*, 276 SW 2d 798 (Tex, 1955); *Maddock v Giles*, 728 A 2d 150 (ME, 1999).

²⁰ Gentzler, above n 4, 314-315.

²¹ *State v Michels Pipeline Construction, Inc.* 63 Wis 2d 278, 217 NW 2d 339 (1974) adopting *Restatement (Second) of Torts* (1997) § 858A.

²² The factors cited are taken generally from the *Restatement (Second) of Torts* (1997) § 858.

²³ National Water Commission, *Annual Report 2008-09* (2009).

²⁴ For example, a riparian owner withdraws water from a surface stream to irrigate his fields, and diminishes the amount of water flow in the stream that services a downstream riparian owner. From this situation, several questions arise, namely, to what extent does the irrigator have a right to withdraw water for the irrigation use? To what extent does the harm inflicted on the downstream owner influence the determination of the amount of water the irrigator is enti-



into account the broader, systemic effects of individual choices upon collective users of water within that system, notably cumulative impacts.

When overall demand exceeds supply, common law rules offer limited guidance. However it would be a mistake to believe that the many departures from the reliance on riparian principles prove that they could not continue be a useful basis for water management. Riparian rules are predicated on an ideal of neighbourly interdependence and the potential for civil action. They create a duty relationship to ensure that some users do not unreasonably harm other users. Civil action is a private markets behaviour and, as such, could be expected to share some of the advantages of other market instruments. The limitation of riparian principles lay in the inability to respond to cumulative systemic changes in the nature and extent of demands and their abandonment occurred at a period of almost universal enthusiasm for government planning and economic development.

One can only conjecture how the riparian system might have evolved to harness civil litigation rather than a shift to centrally planned government allocation.²⁵ The contemporary enthusiasm for the theories of Eleanor Ostrom suggests to us that if such debates were being held today there may have been stronger advocacy for inter-dependent communities self-evolving rules for managing conflict rather than relying on central authority.²⁶ The 'duty to neighbour' principles within the riparian system align well with contemporary calls to modify economic self-interest with social and environmental duties.²⁷

Conflict over water and nationalistic enthusiasm for water as an instrument of development fostered moves towards a centrally planned and government administered vision of how to generate wealth through private enterprise.²⁸ Water issues merged with other larger questions of intra and interstate relationships to force resolution along lines dictated by the broader agenda. In both the United States and Australia, water was a bargaining chip in broader debates about power and relationships within the federation.

First in time: an alternative to simple sharing

In England the riparian doctrine was challenged by a competing doctrine that rights to water should be based on patterns of past use, a prescriptive rights approach.²⁹ Prescriptive rights to water found a niche in the common law as a supplement to natural riparian rights.³⁰ In the relatively arid western United States, the need for an alternative to the riparian rules became apparent as population moved westward in the 19th century. The emergent common law of prior appropriation was premised on the historical use commencing with first use.

It is a doctrine heavily influenced by Lockean ideals of property, that appropriation of water through one's labour prioritises rights of use. This framework substantially informed property law and the United States *Declaration of Independence*. This coincided (as in Australia) with a major change in the sources of wealth from water, and the rivalries that this triggered. It devel-

tled to withdraw? Is the irrigator limited in the manner in which the irrigated water is used? Is the irrigator obligated to return the excess irrigation water to the riparian stream for the benefit of the downstream user?

²⁵ It is interesting to conjecture what may have happened if riparian accountabilities were modernised by the use of complementary legislation that addressed system interdependence, particularly whether the retention of neighbourly civil accountabilities would have been useful in ameliorating some of the subsequent failures of bureaucratic and market processes.

²⁶ National Centre for Development Studies, *The Governance of Common Property in the Pacific Region* (1997) Pacific Policy paper 19; or Nicola Tynan, *How to Have Your Seahorse and Eat It: Conservation of a Common Pool Resource* (IEA Environment Unit, 1999) 24-35.

²⁷ Peter Larmour and Steve Hatfield Dodds, *The catchment care principle: a practical approach to achieving equity, ecosystem integrity and sustainable resource use* (CSIRO, 2004); Nicholas de Sadeleer, *Environmental Principles. From Political Slogans to Legal Rules* (Oxford University Press, 2002).

²⁸ Daniel Connell, *Water Politics in the Murray-Darling Basin* (Federation Press, 2007) Chapter 3.

²⁹ Getzler, above n 4, 272.

³⁰ See generally, *ibid*.



oped in the relative anarchy of the Californian gold rush, and rapidly displaced riparian doctrine in the arid regions of the western United States.³¹

Prior appropriation rules were an adaptation to scarcity and entrepreneurial water consumptive patterns in the West.³² The legal right to water was accorded to the first person to divert it to a 'beneficial use' who did not abandon its use. The contestable legal issues were narrowed to three considerations. Users with established claims to water should have priority.³³ Second, a new user must establish that unappropriated water is available for the use.³⁴ Third, all users, regardless of when they made their claim, must make beneficial use of the water they appropriate.

Prior appropriation 'effectively separated rights to water from rights to land'.³⁵ This decoupling was conceived in a dry environment where water was contested. It was important to distribute the resource to entrepreneurs who would use it most productively rather than to those whose lands merely adjoined the stream. A similar decoupling arose in the also dry southern part of the Australian continent at a later stage but evolved towards a different combination of government issued licences and tradeable rights to extract.³⁶

State governments in the United States moved quickly to regulate prior appropriation. Elwood Mead is credited with the 'Wyoming system', which, through that State's *Constitution*, vested

³¹ The Colorado Supreme Court decision of *Coffin v Left Hand Ditch Co.* 6 Colo.443 (1882) abrogated the riparian doctrine and set out the framework for 'pure appropriation' for property in water.

³² See, C M Rose, 'Energy and Efficiency in the Realignment of Common-Law Water Rights' (1990) 19 *Journal of Legal Studies* 261. The doctrine has also been explained on the basis of distributive justice, breaking monopolies and 'opening access ... to all bona fide users', see, D B Schorr, 'Appropriation in Agrarianism: Distributive Justice in the Creation of Property Rights' (2005) 32 *Ecology Law Quarterly* 3.

³³ See *Nebraska Game and Parks Commission v The 25 Corporation, Inc.* (1990) 236 Neb 671, 463 NW 2d 591.

³⁴ For example, see, *Montana Code Annotated* 85 § 85-2-311 (2009). Criteria for issuance of permit.

- (1) ... Except as provided in subsections (3) and (4), the department shall issue a permit if the applicant proves by a preponderance of evidence that the following criteria are met:
- (a) (i) there is water physically available at the proposed point of diversion in the amount that the applicant seeks to appropriate; and
 - (ii) water can reasonably be considered legally available during the period in which the applicant seeks to appropriate, in the amount requested, based on the records of the department and other evidence provided to the department. Legal availability is determined using an analysis involving the following factors:
 - (A) identification of physical water availability;
 - (B) identification of existing legal demands on the source of supply throughout the area of potential impact by the proposed use; and
 - (C) analysis of the evidence on physical water availability and the existing legal demands, including but not limited to a comparison of the physical water supply at the proposed point of diversion with the existing legal demands on the supply of water.
 - (b) the water rights of a prior appropriator under an existing water right, a certificate, a permit, or a state water reservation will not be adversely affected. In this subsection (1)(b), adverse effect must be determined based on a consideration of an applicant's plan for the exercise of the permit that demonstrates that the applicant's use of the water will be controlled so the water right of a prior appropriator will be satisfied;
 - (c) the proposed means of diversion, construction, and operation of the appropriation works are adequate;
 - (d) the proposed use of water is a beneficial use;
 - (e) the applicant has a possessory interest or the written consent of the person with the possessory interest in the property where the water is to be put to beneficial use, or if the proposed use has a point of diversion, conveyance, or place of use on national forest system lands, the applicant has any written special use authorization required by federal law to occupy, use, or traverse national forest system lands for the purpose of diversion, impoundment, storage, transportation, withdrawal, use, or distribution of water under the permit;
 - (f) the water quality of a prior appropriator will not be adversely affected;
 - (g) the proposed use will be substantially in accordance with the classification of water set for the source of supply pursuant to 75-5-301(1); and
 - (h) the ability of a discharge permit holder to satisfy effluent limitations of a permit issued in accordance with Title 75, chapter 5, part 4, will not be adversely affected.
- (2) The applicant is required to prove that the criteria in subsections (1)(f) through (1)(h) have been met only if a valid objection is filed. A valid objection must contain substantial credible information establishing to the satisfaction of the department that the criteria in subsection (1)(f), (1)(g), or (1)(h), as applicable, may not be met. For the criteria set forth in subsection (1)(g), only the department of environmental quality or a local water quality district established under Title 7, chapter 13, part 45, may file a valid objection ...

³⁵ A G Cuzan, 'Appropriators versus Expropriators: The Political Economy of Water in the West' in T L Anderson (ed), *Water Rights Scarce Allocation, Bureaucracy, and the Environment*, (Ballinger Publication Co, 1983) 19.

³⁶ *National Water Initiative of the Council of Australian Governments River Murray Waters Agreement 1914-15, Rural Water reform of the Council of Australian Governments*, 1994, 2004.



ownership of water in the state. Replicated throughout the West, it replaced the common law with centralised planning and bureaucratic administration. 'In place of full private property rights, Mead's system substituted public ownership and private rights at the sufferance of the state.'³⁷ The state owned the water and could determine who could use it, although the system 'did not significantly change the substantive rules of water law'.³⁸ Prior appropriation rules continued to apply under the supervision of a government planner rather than the courts.

'The notion of public ownership of water resources ... spread rapidly. A number of western states lay claim to their water resources in their state constitutions or water codes.'³⁹ In Colorado, art XVI, 5 of the State *Constitution* stipulated 'The water of every stream ... is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided'.

While using 'communitarian, public-property rhetoric',⁴⁰ these provisions transformed public ownership of the water from the public at large to a state agency on behalf of the public. As in Australia, this reflected a period of confidence in scientific planning and rational allocation by government. This vesting of public ownership of water in the state occurred contemporaneously with a weakening of Lockean property ideals in the latter part of the 19th century.

The re-conceptualization of property as a 'bundle of sticks',⁴¹ enabled property to be viewed as a collection of rights: divisible, separable sticks capable of simultaneous multiple ownership. The metaphor was an intellectual mechanism to facilitate commercial innovations, notably in the financial and traded commodity sectors. Water management was a beneficiary of these non-water developments in property jurisprudence.⁴²

'Regulated riparianism' and interstate river basin compacts

A significant modification of the riparian system occurred in 1957 when the Iowa legislature adopted the 'regulated riparian system'.⁴³ Commentators did not immediately recognize the Iowa system as a dramatic shift, but momentum has been building. In 1997, the American Society of Civil Engineers published its *Regulated Riparian Model Water Code*. This reflected the belief that neither the common law riparian system nor the prior appropriation system adequately met the needs of water users.⁴⁴ The prior appropriation system's rigid priority system could favour a priority user whose water use value to the community might be less than other prospective users. Reflecting Roman principles, regulated riparianism treats water as 'public property' subject to collective decisions through joint management.⁴⁵

Regulated riparianism is intended to combine the flexibility of common law concepts, such as reasonable use, with the stability of the prior appropriation system.⁴⁶ Common elements include administrative allocation through permit systems; evaluation of permit applications based on reasonableness of the use; elimination of requirements to use water in limited places and a time limit on the permit which allows for review of granted authority if the water user seeks to renew

³⁷ Morriss, above n 15, 862-863.

³⁸ Ibid, 922-923.

³⁹ Ibid, 928

⁴⁰ D B Schorr, 'Appropriation in Agrarianism: Distributive Justice in the Creation of Property Rights' (2005) 32(3) *Ecology Law Quarterly* 3 42.

⁴¹ Sally K Fairfax et al, *Buying Nature: the Limits of Land Acquisition as a Conservation Strategy 1740-2004*, (MIT Press, 2005) 15-16.

⁴² Leigh S Raymond, *Private Rights in Public Resources* (Resources For the Future, 2003) 119-122.

⁴³ Joseph Dellapenna, 'Report on the Regulated Riparian Model Water Law Code' (*The American Society of Civil Engineers*, 1997).

⁴⁴ R Timothy Weston, 'Harmonizing Management of Ground and Surface Water Use Under Eastern Water Law Regime' (2008) 11 *University of Denver Water Law Review* 239, 257.

⁴⁵ Joseph Dellapenna, 'Special Challenges to Water Markets in Riparian States' (2004) 21 *Georgia State University Law Review* 305, 314.

⁴⁶ C A Klein, M J Angelo and R Hamann, 'Modernizing Water Law: The example of Florida' (2009) 61 *University of Florida Law Review* 403, 411.

the initial authority. Some regulated riparian jurisdictions embrace integrated ground and surface water management.⁴⁷ Although regulated riparianism retains the common law concept of reasonable use, it incorporates considerations such as public health, safety and welfare, environmental and ecological impact on sources and water sheds, nature and size of use, economic and other benefits derived from use, compatibility with state water plans, and historic and preservation values of the community.⁴⁸ Although the ASCE *Model Code* has not been fully adopted in any United States state, it has received considerable attention in the eastern United States.⁴⁹

At around the same time, other developments focused on resolving disputes through mutually developed procedures across jurisdictional boundaries. Under the *United States Constitution*, the United States Supreme Court has the jurisdiction to hear disputes between states.⁵⁰ For interstate waters cases it applies the 'equitable apportionment' rule.⁵¹ States are treated as equals and the Court fashions a resolution of competing interests. The Court has noted, 'States have an affirmative duty under this doctrine to take reasonable steps to conserve and even augment natural resources within their borders for the benefit of other States'.⁵² The challenging state must establish that the threatened state's rights have been invaded to a serious degree using clear and convincing evidence. The Court has granted relief in approximately half of the cases brought before it.

A state, with the consent of Congress, may enter into an Agreement, or Compact with another state on an issue of mutual importance.⁵³ A 1943 challenge brought by Colorado against Kansas⁵⁴ concerned reduced flows of the Arkansas River that had been litigated in 1907 before the Court. In the 1943 case, the Court noted, that, despite the fact that the Court has jurisdiction to resolve these disputes: '[s]uch controversies may appropriately be composed by negotiation and agreement, pursuant to the Compact Clause of the *Constitution*'.⁵⁵ Mutual accommodation and agreement should be the medium of settlement, instead of the Court's adjudicatory power. In 1961 the *Delaware River Basin Compact* ('DRBC') heralded an innovation: the creation of a collaborative agency. The four basin states⁵⁶ and the federal government share responsibility for managing the Delaware River and its watershed without regard to political boundaries under a common set of procedures.⁵⁷ The commission oversees 'water quality protection, water supply allocation, regulatory review (permitting), water conservation initiatives, watershed planning, drought management, flood loss reduction, and recreation' in the basin area. DRBC activities are funded by the federal government and member states, which charge project review fees, water use charges, fines, and grants.

All water-related projects above thresholds must be approved, or 'docketed', by the commission. The threshold for ground and surface water withdrawal is 100 000 gallons per day averaged over any 30-consecutive-day period. In the Southeastern Pennsylvania Ground Water Protected Area, withdrawal of 10 000 gallons (37 854 L) per day on average over any 30 consecutive days triggers review.

⁴⁷ Weston, above n 44, 258.

⁴⁸ Klein et al, above n 46, 412.

⁴⁹ States that have adopted some form or another of the regulated riparian rule as of 2004 include: Iowa, Maryland, Wisconsin, Delaware, New Jersey, Kentucky, South Carolina, Florida, Minnesota, North Carolina, Georgia, New York, Connecticut, Illinois, Arkansas, Massachusetts, Mississippi, Hawaii, Virginia, and Alabama. Eastern states that are missing include: Maine, Vermont, New Hampshire, Rhode Island, Ohio, Pennsylvania, West Virginia, Indiana, Tennessee, Louisiana, Missouri.

⁵⁰ *United States Constitution* art III § 2.

⁵¹ See *Kansas v Colorado*, 206 US 46, 27 SC 655, 51 LEd 956 (1907).

⁵² *Idaho v Oregon*, 462 US 1017, 1025 103 SC 2817, 2823, 77 LEd 387 (1983).

⁵³ *United States Constitution* art I §10.

⁵⁴ *Colorado v Kansas*, 320 US 383, 64 SC 176, 88 L Ed 116 (1943).

⁵⁵ *Ibid*, 180.

⁵⁶ New York State, New Jersey, Pennsylvania and Delaware.

⁵⁷ C Abdalla, J Drohan and J Becker, *River Basin Approaches to Water Management Bodies in the Mid-Atlantic States*, (2010) <<http://pubs.cas.psu.edu/FreePubs/pdfs/ua466.pdf>>



DRBC requires those conducting groundwater withdrawals that average or exceed 10 000 gallons (37 854 L) per day (gpd) to register their wells. New users may be required to limit withdrawals or provide replacement water if their use interferes with that of established users. Proposals to use waters for drilling into the Marcellus shale for gas extraction must be docketed. DRBC has also been involved in settling disputes within Pennsylvania because Pennsylvania has no ready mechanism for doing so.

The Susquehanna River watershed lies in three states (New York, Pennsylvania, and Maryland). Its status as a navigable waterway gives the federal government an interest in its management. The Susquehanna River Basin Compact (SRBC) was signed in 1970 between the three basin states and the federal government to allow management of the Susquehanna's water and related natural resources with a broad, basin-wide view. In December 2006, SRBC significantly expanded its purview over water withdrawals of all volumes. The commission now requires the renewal of all extant water withdrawal registrations every five years. All proposed consumptive water use projects sourced from ground or surface water require prior approval by SRBC. Consumptive use projects are required to mitigate, or compensate, for their use. Mitigation options include measures such as payments, water reductions, or release of stored waters.

The effect of these conflict-resolving mechanisms is a de-facto shift in water allocation principles. The compact approach overlays a variation of water management onto Pennsylvania, which generally uses the riparian system. Maryland, New York, New Jersey and Delaware are party to one or the other of these compacts but follow regulated riparian systems as described above. By transferring use approval to the Commissions, Pennsylvania has adjusted the substance of its water laws without changing the form of water rights. This mechanism is dependent upon the availability of the constitutional power and a political imperative to manage or avoid particular conflicts. These compacts apply within the areas of drainage into the basins, which leaves parts of states outside of the Basin area⁵⁸ unaffected by the Commission rules, and subject to riparian principles.

Thus, this approach to water conflict resolution can create two (or, in theory, more) water law regimes within the affected states. This is notwithstanding that the Compacts provide that 'Nothing contained in this compact shall be construed as affecting or intending to affect or in any way to interfere with the law of the respective signatory parties relating to riparian rights'.⁵⁹ The DRBC and SRBC 'registration' can be used to provide evidence of historical use and be a factor in determining whether a specific user's access has been reasonable. The 'review and approval' authority extends beyond that, as it demonstrates that access is not only determined on the basis of status as a riparian owner, but also carries administrative agency approval. Each state has, in effect, delegated water allocation authority to the Commissions and away from property owners. Is this the first sign of a United States approach that separates access to water from a water allocation decision, as is the case in Australia? If so, then the next step in water law in these jurisdictions may be shaped by conflict over constitutional arrangements.

As a system based on basin wide factors, the Commissions are moving in the direction that most hydrology experts would support, which in part parallel recent developments in Australia that are discussed later in this paper. However, the DRBC and SRBC are also limited by their basin-oriented focus. Not all areas of the member states are included under these commissions, suggesting the possibility of a lack of consistency in determining the right of a riparian landowner to access water within a state.

⁵⁸ See the definition of the term 'basin' at 32 PS § 815.101 and § 820.1. Parts of western Pennsylvania fall outside of the Susquehanna River Basin and therefore do not fall under Susquehanna River Basin Commission rules.

⁵⁹ For the Delaware River Basin Compact, see § 14.19 at 32 PS § 815 101. For the Susquehanna River Basin Compact, see § 15.19 at 32 PS § 820.1.

Returning to the antipodes

The transformation of property in water from the unallocated commons towards legally enforceable individual rights is a journey with milestones common to both nations. These include the restriction of universal use to create riparian privilege; the development of doctrines adapted to scarcity rather than plenty; the later legal separation of water from land; the affirmation of this decoupling by articulation of property as divisible ‘sticks’ in a bundle of interests; and the vesting of water in the state as public property.

In Australia, to these common elements must be added the elevation of the economic theory of the efficiency of the free market to become the central plank of water law and policy, and the transformation of the social and environmental tradeoffs into problems of market efficiency. In this, if in no other feature, the antipodean approach highlights the power of social philosophy in shaping water laws and institutions (as occurred earlier with the widespread adoption of the Lockean concept of property).

Prior to the Australian Federation in 1901, English common law riparian rules applied in each colony that became a state. State legal authority at Federation continued unless transferred to the Commonwealth.⁶⁰ Authority to abridge the right of any state or its residents to make a reasonable use of river waters for conservation or irrigation was denied the Commonwealth.⁶¹

Section 100 of the *Australian Constitution* states that ‘The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation’. However the *Constitution* also provides power to the Commonwealth, under s 51, in relation to interstate trade and commerce, implementation of international agreements and obligations, and to act on the basis of powers referred to it by the states.

The *Australian Constitution* arose at a time when the key issues of water management were focused around its role as a transport medium, and when attention was turning to the potential for irrigation as a driver for rural development.⁶² Large flows to the lower basin states to float riverboats and the development of industrial scale irrigation infrastructures were of paramount importance. The nature of water conflict shifted over the 20th century, with competition between agricultural districts and then between agriculture and the environment. In Australia, as in the United States, water conflict between mining and farming has also come into recent focus. The mechanisms to address these issues were largely shaped by the *Constitution*, with the recent development of a multi-state ‘cooperative federalism’ reflecting both the hydrology and economics of the river system(s) and the constraints and opportunities created by the *Constitution*.

The delegation of power by states to the Commonwealth was not used, even though it is likely to have led to a more homogenous water law system. That the opportunity was missed is principally because of the strong scepticism of the delegated power mechanism that is attributable to conflicts over income taxation after the Second World War. The result has been a differentiation of water law across states, and complex coordination and state-level bargaining mechanisms. This, in turn, has resulted in high transaction costs of coordination and, arguably, failures of water law and policy to achieve even fully accepted policy objectives.⁶³ This is an ample illustration of our thesis that some key aspects of water law can only be explained by reference to human conflict and politics, and the institutional heritage within which the issues are fought out.

⁶⁰ *Australian Constitution*, s 108.

⁶¹ *Australian Constitution*, s 100.

⁶² Daniel Connell, *Water Politics in the Murray Darling Basin* (Federation Press, 2007) 7-48.

⁶³ National Water Commission, *Annual Report 2008-09* (2009) 6: notably, ‘Lessons from water reform to date highlight the unintended consequences of taking a piecemeal approach to reform, the need to act in an integrated way (carefully considering the sequencing of reforms) and the importance of engaging water users and stakeholders in the process ...’



Up until the early 1990s, state management of water resources vested in state agencies that exercised their legal discretion in the public's interest.⁶⁴ Distinction was made between regulated and unregulated waters. Regulated waters were those in which natural flows were supplemented, conserved or diverted using storage or diversion infrastructure. Withdrawals from unregulated streams were opportunistic and did not follow any rigorous catchment wide planning process.

Up until 1992 the states developed their water law autonomously, as in the United States, using licenses, permits or agreements with the specifics varying by state.⁶⁵ Entitlements were often explicitly attached to real property or referred to specific water storage or reticulation works. Water entitlements were usually issued for a defined period but commonly renewed automatically. Entitlements could be transferred with the title to the property. These water laws can be characterized as residually reflecting riparian rights, but with volumetric constraints specified in administrative licenses.

The widespread belief in the farm sector and in government that there were major economic opportunities from further water infrastructure investment by government required that water licenses support efficient production over large areas. This need led to the restructure of water law to facilitate that investment.⁶⁶ In 1992 the Australian states reached an agreement with the Commonwealth that created a shared responsibility between Commonwealth, state and local governments on environmental matters, reflecting international developments.⁶⁷ This agreement can be seen in the light of the need for the states to find effective platforms to negotiate for federal funding. The structure of water law and administration that has emerged reflects this fiscal force for collaboration even though the *Constitution* provides for water administration by the states.

It was agreed that a Commonwealth environmental interest that involves states would be accommodated in a number of ways.⁶⁸ The Commonwealth and affected states may establish outcomes or standards or the Commonwealth may accredit state practices, procedures and processes. Where the Commonwealth does not agree with state practices, the Commonwealth and states will negotiate and, if agreement is reached, the Commonwealth will approve or accredit the modified practice. It is on these institutional arrangements, based on bargains struck that reflect the combination of: international agreements, the *Australian Constitution*, and pragmatics of bargaining over dollars and powers generally, that the architecture of water law is founded in Australia.

Embracing science/economic modernism

In 1994 the Australian states commenced radical water reform with the Council of Australian Government (COAG) agreement.⁶⁹ This introduced the concept of marketable water rights, untied to land, and the recognition of environmental allocations as a fundamental structure of Australian water law. Ten years later, in 2004, through the *National Water Initiative*⁷⁰ the states recognized a national imperative to increase the productivity and efficiency of water use, to better service rural and urban communities, and to return river and groundwater systems to environmentally sustainable extraction levels.

⁶⁴ D E Fisher, 'Markets, Water Rights, and Sustainable Development' (2006) 23 *Environmental Policy and Law Journal* 100.

⁶⁵ Agriculture and Resource Management Council of Australia and New Zealand, *Water Allocations and Entitlements: A National Framework for the Implementation of Property Rights in Water*, Paper Number 1 (October, 1995) 3.

⁶⁶ Connell, above n 62.

⁶⁷ *Intergovernmental Agreement on the Environment* (1992).

⁶⁸ *Intergovernmental Agreement on the Environment*, ibid para 2.5.1.1.

⁶⁹ Council of Australian Governments (COAG), *1994 Council of Australian Governments Agreement to reform Australian water law* (s1994) Attachment A.

⁷⁰ *Intergovernmental Agreement on a National Water Initiative (NWI)* Between the Commonwealth of Australia and the governments of NSW, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory, (signed 25 June 2004, COAG).

A feature of the water law reform program was the move towards catchment-wide water plans for 'surface water and groundwater management units in which entitlements are issued.'⁷¹ These plans are intended to resolve competing claims, informed by best available science, socio-economic analysis and community input. They 'roll up' into state water plans, which in turn feed into the state/federal negotiations under COAG.

Water planning by states and territories is intended to determine shares in the consumptive pool of available water and the rules to allocate it.⁷² Such plans must take into account:⁷³

1. the condition of the system
2. risks, in particular climate change and land use change, or limitations to the state of knowledge
3. objectives of water allocation policies
4. the knowledge base including how this base is to be improved
5. the uses and users of the water including indigenous water use
6. public benefit outcomes
7. the reliability of the water entitlement and rules on how the consumptive pool is to be allocated
8. the rates, times and circumstances and the quantity of water which water may be taken
9. conditions for entitlements, including monitoring and reporting
10. regional natural resource management plans and cross jurisdictional plans
11. an assessment of connectivity between surface and groundwater
12. impacts on water users and the environment downstream
13. water interception

Progressively since the early 1980s the Australian states, in conjunction with the national government, had created regional catchment management organizations. While their legal structure and responsibilities varied across states, these organisations provided a mechanism through which the national government could overcome constitutional limitations to fund specific projects in particular states and regions, and exercise substantial direct control.⁷⁴ However this contained the seeds of many problems, including difficulties in resolving over-allocation through local compromise, institutional complexity within states, and the problems of tardiness of implementation that are still characteristic of the *National Water Initiative*.⁷⁵ The path down which Australian water laws and institutions are now directed was strongly shaped by institutional arrangements that had been put in place for addressing non-water natural resource management challenges.

'Property-ised' extraction rights

All Australian state governments agreed to implement comprehensive water entitlements with separation of water property rights from land title.⁷⁶ Water access entitlements are defined as an open-ended or perpetual access to a share of the water resource available for consumption as specified in a water plan.⁷⁷ An access entitlement nominally allows the holder a capped volume calculated after deduction of environmental allocations. Access entitlements are only converted to a usufructuary right when approval of the right to use the water is received.⁷⁸

⁷¹ Ibid, 36.

⁷² Ibid, 37.

⁷³ Ibid, 39 sch E.

⁷⁴ The constitutional legitimacy of this compromise is now questionable given *Pape v The Commissioner of Taxation* (2009) 238 CLR 1.

⁷⁵ Paul Martin, Jacqueline Williams and Christopher Stone, *Transaction Costs and Water Reform: the Devils Hiding in the Details*, Technical Report No 08/08 (Cooperative Research Centre for Irrigation Futures, 2008).

⁷⁶ *NWI*, above n 70, 28.

⁷⁷ Ibid.

⁷⁸ Fisher, above n 64.



The tradeable rights include water access and allocation rights, rights to have water delivered by an operator, infrastructure and irrigation rights—which are rights to receive water from an irrigation operator. There are also emerging various derivatives in water rights, including leasing and option arrangements. The fragmentation of interests in water reflects non-water institutional innovations in real estate and financial markets. Water access entitlements, during the recent drought, frequently represented the most valuable asset of rural holdings, and were used as backing for commercial mortgages or other instruments.

The environment is treated as if it were an owner of water.⁷⁹ Environmental water has traditionally been (by default) that water which remains after consumptive demand.⁸⁰ But since the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) 1996 Report, *National Principles for the Provision of Water for Ecosystems*⁸¹ has been interpreted to mean that, on the basis of best available scientific knowledge, water resource planning should put ecological values ahead of consumptive uses.⁸² This significantly altered the practical meaning of extraction rights (whilst nominally leaving them untouched).

The shift to tradeable entitlements highlighted the problem of over-allocation, particularly in the Murray Darling system. That extraction licenses in excess of the sustainable yield from the system had been allocated was previously masked by ‘sleeping’ and ‘dozing’ license holders. ‘Sleeper’ licenses were those granted but not drawn upon, and ‘dozers’ were used intermittently. Because licenses were tied to specific blocks of land, if the adjacent land did not require the full volume of water, there was no economic incentive to extract the water. With tradeability, activation of all licenses in the system became economically attractive. Over-allocation became apparent and has still not been fully resolved.

The *National Water Initiative* provides mechanisms for resuming water licenses to address over-allocation⁸³ or to respond to environmental or scientific contingencies.⁸⁴ In river systems that are over-allocated or stressed, the policy dictates that arrangements must restore the system’s health. As yet this objective has eluded the *National Water Initiative*, though large-scale water right buybacks are occurring. There has been conflict about the issue of environmental flows, resulting in federal and state governments purchasing back water rights, sometimes only a decade after converting administrative licenses into compensable property rights. This represents a pragmatic response conducted within the framework of water law, but this too has generated conflict (and been very costly to the public purse). A critical characterisation would be that this represents a wealth transfer that might have been avoided by rigorous attention to the sustainability of licenses at the time when property rights were created.⁸⁵

Reduction of extraction under the pre-property right regime would have avoided the requirement of purchase. This would have triggered conflict and difficult adjustment, but the absence of a property right basis for compensation claims would have given state and national governments a stronger political hand.⁸⁶ Regardless, water rights have changed the nature of the conflict over water and the resolution methods available to deal with the rights. In turn this has set in place a structure for future water conflict resolution.

⁷⁹ NWI, above n 70, 35.

⁸⁰ Sustainable Land and Water Resources Management Committee Subcommittee on Water Resources Agriculture and Resource Management, *National Principles for the Provision of Water for Ecosystems* (Occasional Paper SWR No 3 Council of Australia and New Zealand and Australian and New Zealand and Conservation Council (ARMCRNZ) (1996).

⁸¹ Ibid.

⁸² Alex Gardner and Kathleen H Bowmer, ‘Environmental water allocations and their governance’, in Karen Hussey and Stephen Dovers (eds), *Managing Water for Australia* (CSIRO, 2007) 43-58.

⁸³ Above n 70 [45, 97].

⁸⁴ NWI, above n 70, 23,25,33,40,63,97,104.

⁸⁵ It should be noted that these coping mechanisms themselves have attracted many critics, arguing that water buybacks are both inequitable and undermining the viability of rural industries and communities.

⁸⁶ The political/legal process through which claims of legal entitlement used as a mechanism for political bargaining which alters the negotiation value of claims is discussed in Ann Brower, John Page, Amanda Kennedy and Paul Martin, ‘The Cowboy, the Southern Man, and the Man from Snowy River: The Symbolic Politics of Property in Australia, the United States, and New Zealand’ (2009) XXI *The Georgetown International Environmental Law Review* 455.

Under the *National Water Initiative*, water access entitlement holders bear the risks arising from climate and natural events.⁸⁷ Risks from improvements in the knowledge of water systems are to be borne by users up to 2014.⁸⁸ Risks arising during the implementation of comprehensive water plans commencing or renewed after 2014 are to be shared under a detailed formula. Government bears the risks from changes in policy,⁸⁹ but in practice, under severe drought conditions, it is often difficult to distinguish between whether causes are attributable to new policy or to climate. The parties can agree to a different risk sharing formula than that specified.⁹⁰

Technical optimisation or managing social conflict?

Having thus far surveyed a broad sweep of water law developments, and seen both common and distinct features emerging in different states within two federal systems, it is clear to us that the evolution of water laws and institutions is not only in response to the need to optimize hydrology to meet economic opportunities. In every instance the dynamic that occurs, and which selects the possible solutions that fit the context, includes social conflict as a driver towards seeking new solutions, and the legal and institutional heritage as the framework for the selection of workable solutions. Further, it is not an abstract consideration of what ought to be that drives effective outcomes, it is a complex mixture of objectivity and political dynamics coupled with pragmatism that prevails.

Water law reflects social philosophies. We have seen this in the shift from a framework reflecting belief in the ability and legitimacy of private citizens resolving their water disputes on the basis of neighbourly accountability; the amendment of this with concepts of 'reasonableness' of interference with another's consumptive use determined by enlightenment principles of logic; thence to Lockean views of the primacy of appropriation; thence to the primacy of economic exploitation; towards a regime predicated on belief that science and economics ought to determine what is 'right' in terms of water access; and thence towards the belief that accountability to the environment can be transfigured into a rights-holder relationship. Are any of these philosophies wrong? No, but it ought to be recognised that neither are they incontrovertible truths, and that philosophies like statistics can be used for multiple ends.

We doubt that absolute advantage can be proven for any type of instrument. The conventional wisdom is that markets are more efficient and effective than command and control systems, and there is ample ex-ante modelling to demonstrate that this ought be so. However there is also ample empirical evidence to demonstrate that what ought to be from theory and what is from experience do not always align. Reconciling theory and empirical reality is the purpose of the scientific method,⁹¹ and the history of innovation amply demonstrates that good theory or useful prototypes more often than not do not convert into practical value. Notwithstanding serious attempts to find the proof that markets do work better than rules, so far the evidence that would support such a determination is not conclusive.⁹² Given the enormous number of variables involved, this ought not be seen as either surprising or unduly sceptical, but it is important to note when considering prospective claims of the performance of any type of natural resource management instrument.

⁸⁷ NWI, Above n 70, 48.

⁸⁸ Ibid 49.

⁸⁹ Ibid 50.

⁹⁰ Ibid 51.

⁹¹ A system of continuous improvement based upon theorising, empirically testing and then refining the theory. Karl Popper, *The Logic of Scientific Discovery* (Basic Books, 1959), refined and expanded this approach with the concept of the centrality of falsification through empirical testing.

⁹² For discussion of these issues see: Robert Stavins, 'Experience with market-Based Environmental Policy Instruments' Discussion Paper 01-58, *Resources for the Future* (2001); P Elliadis, M M Hill and M Howlett (eds), *Designing Government: From Instruments to Governance* (McGill-Queens University Press, 2005); P Martin, R Bartel, J Sinden, N Gunningham and I Hannam, *Developing a Good Regulatory Practice Model for Environmental Regulation Impacting on Farmers* (Australian Farm Institute and Land and Water Australia, 2007).



In this light we pose the following questions, which go to the heart of some of the assumptions of the modernist paradigm underpinning much water law debate.

- Are water laws about water, its economic use, and the ecological limits to that use; are they about the management of social conflict within a democratic framework; or are they equally about all of these matters?
- Should the measurable outcomes be effective law, efficient water allocation and dollars or are they measures of social cohesion and the implementation of the values that underpin democratic theory?
- Are we being unduly myopic in our focus on instrumental choice debates about the architecture of water regimes, and failing to give proper recognition to the prosaic challenges that must be met for any instrumental strategy to be effectively implemented? We cannot but wonder whether the 'command and control versus market' debates might be less useful than they at first seem.

The resolution of such questions has implications for the types of enquiry that is considered to be essential in creating water law and policy and how the issues that arise should be addressed. Subsidiary to this, we would question the extent to which it is changes to the technical architecture (such as the adoption of tradeable entitlements or adjustments to access rights), rather than better knowledge about systems, interactions and cumulative effects, that is likely to change water outcomes.

We do not question the modernist emphasis on hydrology and economics with the intention of being economic Luddites, arguing for a return to the past when the emphases were more social. Nor do we believe that command and control is better (or worse) than market instruments.⁹³ Rather, we raise them because the evidence suggests that water lawyers and policy makers may not be being sufficiently rigorous in questioning the received wisdom of water policy modernism, when there are significant questions that remain unasked, let alone answered.

Architecture or implementation?

These questions turn our attention to the final aspect of this paper, which is to consider the extent to which issues of implementation and social context may be significant, despite seeming to receive little attention in western water law and policy scholarship. We illustrate these final points with the most modernized water system of those we have reviewed in this paper.

The contemporary Australian water law system is an archetype of the contemporary science /markets/sustainability paradigm for natural resource management. There is an enormous, almost unquestioned belief that a policy architecture that replaces regulation with markets and which places science at the heart of its design will reliably result in effective and efficient outcomes. The *National Water Initiative* is a masterpiece of hydrological modelling and economic sophistication, the creation of which has involved the exercise of (and confidence in) high-level technical skills and previously inconceivable financial investment. It is a test bed for observing the extent to which the modern theoretical paradigm is sufficient to the task of creating water laws that work.

Hussey and Dovers⁹⁴ see the *National Water Initiative* in quite a different light to its authors. They identify the eventual Australian *National Water Initiative* as a product of political compromise, embodying tensions reflecting a lack of recognition of the differences in values, rationalities and political imperatives of the multiple players. They suggest that negotiation will be a characteristic of the implementation of the *National Water Initiative*. They note that water

⁹³ Michael G Faure, 'Instruments for environmental governance; what works?' (keynote address presented at Annual Colloquium of the Academy for Environmental law of the IUCN, Wuhan, 1-5 November 2009).

⁹⁴ Karen Hussey and Stephen Dovers, 'International Perspectives on Water Policy and Management: Emerging Principles, Common Challenges' in Karen Hussey and Stephen Dovers (eds), *Managing Water for Australia, the Social and Institutional Challenges* (CSIRO, 2007) 141-150.

policy is criticised as being driven by an exploitative paradigm,⁹⁵ in which many interests are not winners. The interests of the non-winners is treated as a side issue to the architecture, not a core concern. As many value differences were largely unresolved in the policy formulation stage, it is not surprising that the tensions created are now resulting in barriers to later implementation.

The OECD⁹⁶ highlighted good progress on those aspects of Australia's water reform that can be given effect by 'top-level' legislative and administrative practice. However, the OECD reported increasing water consumption; over-allocated river systems and groundwater aquifers; algal blooms adversely impacting aquatic ecosystems; and poor coastal water quality, and water losses due to leakages and evaporation from old rural and urban water supply systems. The need for better information for decision-making was identified, along with the lack of achievement of full cost recovery of irrigation water delivery.⁹⁷ Barriers to water trade remain and incentives for urban consumers to conserve and re-use water were considered low.

Quiggin⁹⁸ also reviewed water policy and also found many potential failures. The National Water Commissioner⁹⁹ has identified the main barrier to the *National Water Initiative* implementation as being the domination by government which has led to confusion and conflicts among government roles; delays in decision-making and investment; distortions to optimal investment patterns; distortion of water authorities investments; distortion of price signals relating to costs and scarcity; politics overriding science; and denial of available private sector finance. To address this barrier the Commissioner called for the 'right' level of government involvement; the utilization of markets to the maximum feasible level; the involvement of the private sector to the maximum feasible level; and the use of science based decisions, recognizing that ultimately the choices, judgments' and trade-offs will be of a political nature.

What these authors are in effect saying is that a fundamental determinant of the outcome of the national water initiative is the many 'second-order' implementation decisions. The detailed Second Biennial Assessment of the implementation of the *National Water Initiative*¹⁰⁰ is specific in highlighting the failures of implementation and in restating the adverse effects on the environment and water users of the failures of implementation.

By late 2006 it was clear that implementation of the Australian *National Water Initiative* was falling well behind expectations. Many conflicts were emerging, aggravated by a record shattering national drought. State governments in southern Australia were recoiling from the idea that the buying and selling of water should be the mechanism for its allocation and capping water transfers. There was strong evidence that the initially-agreed institutional arrangements were insufficient to implement the desired water regime.

The *Water Act* of 2007 was then created to establish a unified implementation structure for the major trans-state water system, the Murray Darling Basin.¹⁰¹ It fully adopted the modernist water

⁹⁵ D Mercer, L Christesen and M Buxton, 'Squandering the future – climate change, policy failure and water crisis in Australia' (2007) 39 *Futures* 272.

⁹⁶ OECD, *Environmental Performance Reviews: Australia* (2008).

⁹⁷ See also, R J S Beeton, Kristal I Buckley, Gary J Jones, Denise Morgan, Russell E Rechelt, Denis Trewin, 'Australia State of the Environment 2006' (Independent report to the Commonwealth Minister for the Environment and Heritage, Department of Environment and Heritage, 2006).

⁹⁸ J Quiggin, *Key issues in Australian Water Policy* (University of Queensland Brisbane, 2007).

⁹⁹ K Matthews, foreword to the *Australian Government National Water Commission Australian Water Markets Report* (2007-2008) and for further details see *Australian Government National Water Commission, Australian Water Reform: Second Biennial Assessment of Progress in Implementation of the National Water Initiative* (2009).

¹⁰⁰ Australian Government National Water Commission, *Australian water reform: Second biennial assessment of progress in implementation of the National Water Initiative* 2009.

¹⁰¹ *Water Act 2007* (Cth). Key features of the 2007 Act:

Part 3: Water Charging Principles; Part 11, Sections 240-246: Basin wide water planning;

Section 15-17 coordinating legislation between Commonwealth and the State;

Section 22: Management of Basin water resources; mandatory contents of Basin Plan;

Section 26: Water Trading and Transfer Rules, including authority to specify areas within which tradeable water rights may be traded or transferred;

Schedule 3 Basin water market and trading objectives and principles;



law paradigm, with water trading within the limits of science-determined limits to sustainable use being entrenched as the exclusive basis for the operation of the system. Whilst community and social impacts were to be given weight, the legal mechanisms made it difficult to compromise or adjust to any 'human' factors that did not fit the modernist science/economics optimization paradigm.

The Act addresses market requirements including compensation and trade.¹⁰² In March 2008 the Murray-Darling Basin Authority was made responsible for developing and implementing a plan under complex arrangements designed to overcome constitutional impediments. The agreement recommended that the *National Water Initiative* be expanded to include a National Water Accounting Model and supplementary urban water actions, and improved institutional and market arrangements.

On 29 April 2008, the Commonwealth government allocated A\$13 billion to improve water management in the Basin, A\$3.1 billion would be used to buy back water access entitlements from irrigators, for the environment. An additional A\$6 billion would be for infrastructure improvements. The water buy-backs illustrate the tendency to pursue triple bottom line (TBL) objectives using loosely related instruments, with the implementation strategy being necessarily shaped by political pragmatism.

In recent months the results of this effort have come to fruition. After labouring mightily, with extensive research and community workshops, the draft of an explanatory memorandum of the (unreleased) draft plan was released. It was greeted by howls of political opposition, with the most common complaints being about risk to communities, and the failure of the Authority (and by implication the government) to 'listen' and adjust to these community needs. Conflict was not reduced by the Authority's (we believe legally correct) statements that the approach was the necessary result of the *Water Act* embedding the science/markets paradigm as paramount. As at the time of writing, the Authority and the *Plan* are undergoing radical rethinking, with a strong emphasis in all quarters upon the need for the result to manage the inevitable conflicts, and to reflect properly a humanist perspective on the task. Given the history of water law we have reviewed, this ought not be seen as a radical or surprising result. What is more of note is that the drafters of the legislation gave so little attention to the mechanisms that would be needed to fully understand and give sufficient weight to community and conflict issues, compared to the great pains that they took to establish the basis for the operation of markets and the incorporation of science.

The failure to give adequate weight to social and political implementation matters has resulted in at least a significant delay in the timetable intended by the legislators, and probably the necessity for further compromises. The result of the conflict may be a better outcome than would have arisen otherwise but this then begs the question why the drafters did not allow for this process of community contestation in the mechanisms that they created in the legislation. A viable strategy is one that will work within the political and institutional context given available resources. Excessive opposition or insufficient resources are political factors that can impact on resources required and the capacity to implement any given policy. We have seen in the water law histories of both the United States and Australia that political negotiation and compromise is often the main game of water regime development: politics is not a side issue to a main game of science and economics, or merely a frustrating inconvenience. Integrated water resources management is unavoidably political, involving a wide range of competing values.¹⁰³

This paper has spanned many issues over many years. It questions some basic assumptions about the way in which water law regimes have evolved, the standards they have implemented, and their efficiency and effectiveness in achieving identified goals. The paper highlights the import-

Section 74 Simplified outline of risk reduction system, including when compensation would be payable.

¹⁰² Various elements of sustainability and over allocation are addressed in s 4.

¹⁰³ Matthews above n 99.

ance of considering the intersection between architectural design policy, and its change-process/implementation. It is comfortable for water policy makers to believe that success or failure is attributable to their instrumental choice and design skill, and then set up approaches that put emphasis on this aspect of water law. However human factors, as well as inherited institutional settings and norms for conflict resolution in society, require equal consideration. These matters are not readily converted into a scientific discourse but are essential to understanding what makes 'effective' water law and policy. In this paper, we hope we have successfully drawn attention to these less tractable but very important components of water law and policy, for without due attention to them in the design of modern water laws, the implementation of these laws and their social justice effectiveness, will be compromised.

Keywords: water law, Australian water law, United States water law, historical evolution of water allocations

