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**Protection of environmental water within a market-based  
framework: an examination of legal approaches in  
Colorado, Alberta and Australia**

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# Protection of environmental water within a market-based framework: an examination of legal approaches in Colorado, Alberta and Australia

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## **Abstract**

**It is uncertain whether market-based water allocation regimes can be successfully deployed to deliver water for environmental needs, with uneven results demonstrated across jurisdictions that have experimented with markets as a regulatory tool. The Paper will compare and evaluate the regulatory and institutional tools adopted in Australia, Colorado and Alberta for environmental water requirements. It will then outline four key lessons that have emerged from the comparative analysis that can inform the design and implementation of market-based water allocation regimes to promote environmental objectives.**

## **Introduction**

In many jurisdictions, water allocation laws were originally designed to promote settlement, as well as agricultural and industrial expansion. These legal settings also led to the over-appropriation and degradation of some water bodies, particularly in arid and semi-arid regions. Problems of scarcity and declining river health emerging out of water allocation frameworks were originally considered to be water supply crises, and in this context water entitlement holders sought solutions that shored up the delivery of their water entitlements. It is now widely acknowledged that the sustainability of aquatic ecosystems is an equally significant problem, and that legal provision needs to be made for environmental water

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<sup>1</sup> This Paper is a preliminary analysis, which will continue to be developed as part of my PhD thesis.

requirements within water allocation systems.<sup>2</sup> Introducing environmental water uses into established water allocation frameworks threatens many powerful economic interests, and water managers have avoided any solution that would see an uncompensated reduction or acquisition of entitlements.<sup>3</sup> Accordingly, a number of governments have endorsed voluntary water trading mechanisms to take the political sting out of the reallocation task.<sup>4</sup>

Water markets can certainly achieve an efficient balance between supply and demand, and promote water efficiency.<sup>5</sup> However, without further safeguards, the ability to transfer water licences can intensify water use, as licensees are incentivised to transfer water that might otherwise have been left in or returned to the water body.<sup>6</sup> Trading instruments also have some limitations when dealing with the diffuse public values of water.<sup>7</sup> Perhaps the most important limitation is that water trading cannot in itself address the underlying problem of over allocation of the resource.<sup>8</sup>

A number of legal systems around the world have attempted, at least to some degree, to integrate environmental concerns into market-based regimes for allocating water by, for example, setting some legal parameters within which water markets must operate, and incorporating mechanisms for recovering environmental water.<sup>9</sup> This Paper will examine a spectrum of market-based approaches to the allocation of water between consumptive and environmental uses in the Alberta province of Canada, the Murray-Darling Basin in Australia and Colorado, in the western United States. At one end of the spectrum is Australia, with a highly regulated approach to environmental water requirements in which the state sets limits on the market in order to ensure that certain environmental objectives are met. Under this model, the state does not make the actual allocation decisions, but delineates all of the other organising parameters of the market. Colorado falls at the other end of the

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<sup>2</sup> The focus of the paper will be on measures to secure surface water flows; however many of the principles are also relevant to groundwater management.

<sup>3</sup> William L. Andreen, "Water Law and the search for sustainability: a comparative analysis", in R. Quentin Grafton and Karen Hussey (eds), *Water Resources Planning and Management* (2011) Cambridge University Press, UK, at 155; Henning Bjornlund, "The Competition for Water: Striking a Balance among Social, Environmental and Economic Needs", C.D. Howe Institute Commentary, No 302, April 2010, 5.

<sup>4</sup> Henning Bjornlund, above note 3, 5.

<sup>5</sup> Oliver M Brandes, Linda Nowland and Katie Paris, *Going with the Flow? Evolving Water Allocations and the Potential and Limits of Water Markets in Canada* (December 2008), 21.

<sup>6</sup> David Percy, "Responding to Water Scarcity in Western Canada" (2004-2005) 83 *Texas Law Review* 2091, 2102. Water transfers may also result in increasing water use through the activation of "sleeper rights": see Percy, 2102.

<sup>7</sup> Joseph Sax, "Understanding Transfers: Community Rights and the Privatisation of Water" (2008) 14 *Northwestern Journal of Environmental Law and Policy* 33.

<sup>8</sup> National Water Commission, *Water markets in Australia: a short history* (December 2011), 116.

<sup>9</sup> Andreen, above note 3, 155.

spectrum, in that the state limits its role to the protection of property rights, although it participates in the market on a voluntary basis to provide for particular instream flow measures.

The implementation of market-based approaches to the restoration of rivers and enhancement of freshwater ecoservices are still in their early stages, and it is difficult to provide a definitive evaluation of their effectiveness. Accordingly the primary focus of this Paper will be to examine the legal robustness, and the effectiveness of implementation, of the spectrum of legal approaches demonstrated by the three countries, isolating current flaws and legal uncertainties that will need to be resolved in order for environmental water requirements to be appropriately safeguarded within a market-based framework.

Part 1 of the Paper will set out the underlying system for water entitlements in each jurisdiction, before outlining the market-based water allocation frameworks. Some background on the basis for water entitlements under each framework is important, as the constraints and opportunities in each water allocation system can have a bearing on the effectiveness of reforms and initiatives designed to improve environmental outcomes. Those features can also influence whether reforms were designed to build on what already exists, or involve a fundamental restructure of water governance. Part 2 will then evaluate the extent to which the three regimes are likely to be effective in promoting environmental objectives, and outline four key lessons that have emerged from the comparative analysis that can inform the design and implementation of market-based water allocation regimes to promote environmental objectives.

## **1. Market-based water allocation frameworks**

### ***(a) Colorado's voluntary model***

Colorado has a water trading tradition of over 150 years, and also runs the most active water buyback program for “instream flows” in the western United States.<sup>10</sup> However many rivers and streams in Colorado are depleted and unable to sustain healthy fisheries.<sup>11</sup> Moreover, Colorado's population is expected to double in the next 40 years, which has resulted in a

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<sup>10</sup> Larry Simpson and Klas Ringskog, *Water Markets in the Americas* (World Bank, 1997), 2. The instream flow program is established under Title 37, Article 92-102(3) of the Colorado Revised Statutes. Water markets are administered by the state engineer through seven water divisions, which incorporate the drainage basins of each major river.

<sup>11</sup> Colorado Trout Unlimited, *Year in Review* (2010), 4.

“significant and immediate” water supply challenge, and the likelihood of further degradation of water bodies.<sup>12</sup>

Water rights in Colorado are governed by a prior appropriation system, in which water users can “appropriate” water for any beneficial use recognised by law. Colorado does not have a permit system; instead water rights are adjudicated by a specialised water court established in each judicial district of the state.<sup>13</sup> Priority is based on the principle of “first in time, first in right”, where users with earlier adjudicated water use have priority over more recent “junior” users.<sup>14</sup> Appropriation rights exist as long as water continues to be used for beneficial purposes<sup>15</sup> and, once vested, appropriative water rights benefit from a degree of constitutional protection.<sup>16</sup> The system is regarded as entrenched in Colorado’s economy and legal system, and this provides some explanation of why water reforms have taken place “within the system” rather than as part of a comprehensive reform.<sup>17</sup>

The prior appropriation system adopted can lead to problems for water governance, as it is inflexible and locks into place past land use patterns.<sup>18</sup> Moreover, if a prior appropriation water right in Colorado is not used for a beneficial purpose, then the holder forfeits the right, in whole or in part.<sup>19</sup> This acts as an incentive to use the maximum allocation available.<sup>20</sup>

Instead of imposing external limits on water extraction, Colorado has adopted a voluntary approach to the protection of non-consumptive uses through the state’s Instream Flow Program (Program).<sup>21</sup> The Program was established in 1973, in order to recognise the maintenance of instream flows as a “beneficial use” of water and also remove the

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<sup>12</sup> Colorado Water Conservation Board, *Stateside Water Supply Initiative 2010, Colorado’s Water Supply Future* (January 2011), ES-1.

<sup>13</sup> See Edna. T. Loehman and Sasha Charney, “Further down the road to sustainable environmental flows: funding, management activities and governance for six western US states” (2011) 36(7) *Water International* 873, 880.

<sup>14</sup> State Constitution of Colorado, Article XVI, sections 5-6.

<sup>15</sup> AMEC Earth & Environmental, “Comparison of the Water Allocation Process in Alberta to Other jurisdictions” March 2008, ii.

<sup>16</sup> The Colorado Constitution prevents property from being taken or damaged for public use without compensation to the provide owner (Article II, s15), as the right to use water acquired by priority of appropriation is deemed to be a property right: *City of Denver v Bayer* (1833) 7 Colo 2 and *Sterling v Pawnee Ditch Extension Co* (1908) 42 Colo 421: see Michie’s Legal Resources (LexisNexis 2011), Annotations to the Constitution of the State of Colorado.

<sup>17</sup> Thomas Garry, “Water Markets and Water Lessons in the United States: Lessons from Australia” (2007) 4(2) *Macquarie Journal of International and Comparative Environmental Law* 23, 54.

<sup>18</sup> Percy, above note 6, 2104.

<sup>19</sup> Kwasniak, above note 42, 332.

<sup>20</sup> Kwasniak, above note 42, 333.

<sup>21</sup> See Loehman and Charney, note 13 above, 875. It is beyond the scope of this Paper to examine the involvement of the Federal Government in instream flow protection, although it is noted that federal involvement in instream flow issues can be significant, for example under the *Endangered Species Act 1972*.

requirement of a diversion to appropriate water.<sup>22</sup> Under the statute, the Colorado Water Conservation Board (CWCB) has the exclusive ability to purchase existing water rights and change them to instream flow purposes in order “to preserve the natural environment to a reasonable degree”, and third parties may purchase water rights and dedicate them to the CWCB for the same purpose.<sup>23</sup> Proponents of the Program consider it a reasonable compromise, and consistent with the principles of the prior appropriation system.<sup>24</sup> A report from the CWCB indicates that the phrase “preserve the environment to a reasonable degree” has been interpreted to include the protection of fish and other aquatic organisms, riparian areas, and the environment, but not the protection of wildlife, recreation, aesthetics or, significantly, water quality.<sup>25</sup> Commentators have observed that in practice the CWCB usually bases its minimum flows on the amounts needed to preserve coldwater fish habitat.<sup>26</sup>

Transaction costs for water transfers in Colorado are high with the adjudication of water rights through the water courts, and the CWCB must take a number of procedural steps in addition to those required of other consumptive users before applying for new appropriations.<sup>27</sup> If granted, the priority of the instream right is set at the date of application and instream flow rights in Colorado are junior to other established rights.<sup>28</sup> The adjudication provisions do however provide the CWCB with the opportunity to review every water right application filed in the state water court for potential impacts to existing instream flow water rights, and if potential injury is identified, the CWCB may file a statement of opposition with the water court and seek protective terms in that decree. This protection through filing statements of opposition has allowed junior instream flow water

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<sup>22</sup> Colorado Revised Statutes 37-92-102(3), which recognised the need to “correlate the activities of mankind with some reasonable preservation of the natural environment”; see also National Science and Technology Centre, “Western States Water Laws: Colorado – Water Rights Fact Sheet”, 15 August 2001, available at [www.blm.gov/nstc/WaterLaws/colorado.html](http://www.blm.gov/nstc/WaterLaws/colorado.html).

<sup>23</sup> Colorado Revised Statutes 37-92-102(3); see also National Science and Technology Center, above note 22.

<sup>24</sup> P. Andrew Jones and Tom Cech, *Colorado Water Law for Non-Lawyers* (2009, Columbia University Press), 225-226.

<sup>25</sup> Reed D. Benson, “‘Adequate Progress’ or Rivers Left Behind? Developments in Colorado and Wyoming Instream Flow Laws Since 2000” (2006) 36 *Environmental Law* 1283, 1287, citing Sasha Charney, *Decades Down the Road: An Analysis of Instream Flow Programs in Colorado and the Western United States* (Colorado Water Conservation Board, 2005), 10.

<sup>26</sup> Benson, above note 25, 1287.

<sup>27</sup> National Science and Technology Center, above note 22. In particular a natural environment must exist that will be preserved by the water to be appropriated, and the CWCB must analyse the extent of the benefits of the water. The public has an opportunity to review and comment on the recommendations before the CWCB submits the application to the water court.

<sup>28</sup> Benson, above note 25, 1288; Colorado Revised Statutes 37-92-102(3)(b); see also National Science and Technology Center, above note 22.

rights to “gain some relevance in Colorado’s prior appropriation system”.<sup>29</sup> If flows fall below the instream right and that right has sufficient priority to make water available, the CWCB can place a “call” to meet its inflow requirements.<sup>30</sup>

Since 1973, various legislative amendments have been effected in order to strengthen and enlarge the scope of the Program.<sup>31</sup> The CWCB’s authority to acquire senior rights through not only appropriation but also, among other matters, lease, donation or “other contractual agreement” has now been clarified.<sup>32</sup> Further flexibility has also been provided by amendments that allow long-term leasing to CWCB<sup>33</sup>, and which authorise local governments to obtain water rights for Recreational In-Channel Diversions “for reasonable recreation experience in and on the water”.<sup>34</sup> The CWCB is now authorised to, not only “preserve”, but also “improve” the natural environment.<sup>35</sup>

The CWCB historically had to rely on gifts and donations. However in 2008 legislation was passed to dedicate severance tax funds of up to US\$1 million annually to the CWCB for instream flow lease and rights purchases.<sup>36</sup> The mechanics and costs of some acquisitions are also shared by voluntary organisations such as the Colorado Water Trust and Trout Unlimited, for example the Colorado Water Trust locates and negotiates with potential sellers, and may share the costs of some acquisitions.<sup>37</sup> In 2009 the Colorado Government established a tax credit program, in which the CWCB allocates income tax credits to landholders who donate water rights to the Instream Flow Program.<sup>38</sup>

### **(b) Alberta’s discretionary model**

Alberta is the only province in Canada with a formalised market transfer system, which was introduced as part of significant reforms to the *Alberta Water Act 1999*. Water is a scarce

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<sup>29</sup> Charney, above note 25. The CWCB has successfully negotiated terms and conditions to ensure its instream flow rights are protected in over 99% of the cases it enters: Dan Merriman and Anne M Janicki, “Colorado’s Instream Flow Program – How it Works and Why It’s Good for Colorado”, 33.

<sup>30</sup> Benson, above note 25, 1289.

<sup>31</sup> Merriman and Janicki, above note 29, 1.

<sup>32</sup> Colorado Revised Statutes 37-92-102(3); Loehman and Charney, above note 13, 882.

<sup>33</sup> Colorado Revised Statutes 37-92-102(3). Previously only short-term (up to 120 days) leases were allowed: Loehman and Charney, above note 13, 882. Penalties were also removed for non-use due to leasing to CWCB.

<sup>34</sup> Colorado Revised Statutes 37-92-102(6).

<sup>35</sup> Colorado Revised Statutes 37-60-123; Loehman and Charney, above note 13, 882.

<sup>36</sup> Colorado Revised Statutes 37-60-123(7); Loehman and Charney, above note 13. Up to US\$500,000 annually is additionally available for water acquisitions through the Species Conservation Trust Fund.

<sup>37</sup> Productivity Commission Research Report, *Market Mechanisms for Recovering Water in the Murray-Darling Basin*, March 2010, 330.

<sup>38</sup> Colorado Revised Statutes 39-22-533; Productivity Commission above note 37, 330. The tax credits will be up to 50 per cent of the value of the donated water right, as determined by the CWCB.



resource in Alberta, and is not always located where needs exist, with 13% of the river flows servicing 88% of the population for domestic, agricultural and industrial uses.<sup>39</sup> The over allocated South Saskatchewan River Basin (SSRB) was the chosen for Alberta's first transfer program and is now closed to further surface and connected groundwater licences. Alberta has a prior *allocation* system of water rights, which is in practice very similar to a prior appropriation system. Under Alberta's system the right to use water is acquired by licence or other authorisation from the Crown, and priority is also established on a "first-in-time, first-in-right" basis.<sup>40</sup> However, unlike Colorado, the quantity of water allocated under each licence is measured by the terms of the licence itself rather than the amount of water that an individual puts to beneficial use, and priority is determined by the date of the application.<sup>41</sup> Further, water rights are not protected under the Canadian Constitution or the *Canadian Charter of Rights and Freedoms*.<sup>42</sup>

Australia and Alberta's regimes can be distinguished from Colorado's to the extent that their organising frameworks have included measures designed to protect ecological flows from the operation of the market.<sup>43</sup> However in Alberta the implementation of those measures is entirely within the discretion of state agencies.

### **(i) Water planning**

Alberta's *Water Act 1999* does not directly address the need to ensure aquatic ecosystem health, but instead provides for an aquatic environmental strategy as well as a number of instruments that might be used to protect and restore ecosystem health.<sup>44</sup> The Minister is required to establish a framework for water planning, which must also include a strategy for protecting the aquatic environment.<sup>45</sup> However a wide discretion is provided under the Act as to the components the Minister may choose to include in the framework, including whether or not to include components relating to the development of water conservation objectives (WCO) and local water management plans. Those WCOs and local water

<sup>39</sup> Brandes et al, above note 5, 31.

<sup>40</sup> See Brandes et al, above note 5, 81-82.

<sup>41</sup> Percy, above note 6, 2095.

<sup>42</sup> Constitution Acts 1867 to 1982; Arlene Kwasniak notes that prior allocation rights are not likely to be property rights, although the matter has not been finally determined by the courts and that, even if they were property rights, they are not afforded any protection under the Constitution: (2009-2010) 13 *University of Denver Water Law Review* 321, 330.

<sup>43</sup> Nigel Bankes, "Policy Proposals for Reviewing Alberta's Water (Re)Allocation System" 20 *Journal of Environmental Law and Practice* 81, 85 and 94.

<sup>44</sup> Bankes, above note 43, 86.

<sup>45</sup> Section 7.

management plans are themselves a discretionary measure.<sup>46</sup> However either an approved water management plan or cabinet approval is required before a water transfer is permitted under the Act.<sup>47</sup> Under these water management plans, the instream flow need (IFN) for the relevant rivers is identified.<sup>48</sup>

A WCO is defined as:

the amount and quality of water established by the Director under Part 2, based on information available to the Director, to be necessary for the

- (i) protection of a natural water body or its aquatic environment, or any part of them,
- (ii) protection of tourism, recreational, transportation or waste assimilation uses of water, or
- (iii) management of fish or wildlife

and may include water necessary for the rate of flow of water or water level requirements.<sup>49</sup>

Only the “Government” may hold a licence for the purposes of implementing a WCO<sup>50</sup>, and this limitation also applies to transfers of WCO licences under the Act.<sup>51</sup> The decision whether to grant that application to Government is also within the Director’s discretion.<sup>52</sup>

There are a number of further provisions that give the Director a discretion as to whether or not to consider WCOs (if they exist) and the aquatic environment in making decisions under the Act.<sup>53</sup> An important power is contained in section 60 of the Act, dealing with renewals, which provides the Director with the discretion to decide not to renew a licence on the ground that “the water conservation objective of a natural water body from which the diversion of water will be made is not being met”.<sup>54</sup> However the power applies only to

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<sup>46</sup> Sections 9 and 15.

<sup>47</sup> Section 81(1)(7)

<sup>48</sup> See Brandes et al, above note 5, 22.

<sup>49</sup> Section 1(hhh) Interpretation. The Director’s decision to establish a WCO, or the content of that decision, is not a matter that can be appealed to the Environmental Appeal Board.

<sup>50</sup> Section 51.

<sup>51</sup> Sections 81-83.

<sup>52</sup> Section 51. A WCO licence may authorise: the diversion of water; the operation of a works; and providing or maintaining a rate of flow of water or water level requirements.

<sup>53</sup> See s51 (decision to issue licence); s53 (decision to make no further allocations of water within a water management area); s66 (decision to issue preliminary certificate); s82 (water transfers); however see s82(3) which allows the Director to permit a transfer only if he or she forms the opinion that the transfer will not have an adverse effect on the aquatic environment.

<sup>54</sup> Section 60(3)

post-Act and therefore junior licences<sup>55</sup>, and section 60 does not require the Director to refuse to renew a licence where a WCO is not being met.<sup>56</sup>

**(ii) Holdbacks**

Unique to Alberta is the ability when transferring a water licence to hold back a proportion of water for environmental purposes in certain circumstances.<sup>57</sup> Specifically, under section 83 of the *Water Act 1999*, if the Director is of the opinion that withholding water is in the public interest to protect the aquatic environment or to implement a WCO, the Director may withhold up to 10% of an allocation of water under a licence that is being transferred where authorised in an approved water management plan or by order of the Lieutenant Governor in Council. The *Water Act* then provides three options in terms of the purposes for which the withheld water may be applied.<sup>58</sup> First, the water may be left in the relevant water body for the purposes of “providing or maintaining a rate of flow of water or water level requirements”, without a licence being issued in respect of that water.<sup>59</sup> Secondly, the water may be held under a Crown reservation for any purpose or may supplement an existing reservation. Thirdly, the Government may hold a licence protecting the held-back water, and that licence would hold the priority of the transferred licence.<sup>60</sup>

**(c) Mandatory model in the Murray-Darling Basin**

Australia has developed the most advanced water market in the world in order to respond to issues of scarcity, over allocation and environmental degradation within the Murray-Darling Basin (MDB). Over 90% of Australia’s water market activity occurs in the southern MDB, in which trading can take place across state boundaries.<sup>61</sup> Access to and use of water is governed by statutory water rights administered by state and territory governments. Unlike Colorado, water rights do not receive protection under the Constitution.<sup>62</sup>

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<sup>55</sup> Section 18

<sup>56</sup> See Nigel Bankes and Arlene Kwasniak, Joint Submission on the Draft SSRB Water Management Plan (20 December 2005), 8.

<sup>57</sup> Section 83.

<sup>58</sup> Section 83(3).

<sup>59</sup> Section 83(3)(a).

<sup>60</sup> Section 83(3)(c).

<sup>61</sup> National Water Commission, above note 8, 98.

<sup>62</sup> Australian states have no constitutional obligation to compensate when they acquire the property right of an individual. However some constitutional uncertainty was created in the context of water frameworks in situations where the Commonwealth has entered into funding agreements with the states to effect particular water reform objectives: see *ICM Agriculture Ltd v The Commonwealth* (2009) 240 CLR 140 (ICM); *Arnold v Minister Administering the Water Management Act 2000* (2010) 240 CLR 243; *Spencer v Commonwealth* (2010) 269 ALR 233. It was ultimately held that such rights were in the nature of a “statutory dispensation from a general prohibition” against taking

Australia's rainfall is "highly episodic and stochastic", which has led to a general approach of defining access rights as a portion of the total pool of water available each year, rather than as a fixed volume.<sup>63</sup> A water access entitlement is defined as "a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool, as defined in the relevant water plan".<sup>64</sup> A water allocation is the "specific volume of water allocated to water access entitlements in a given season, defined according to the rules established in the relevant water plan", and allocation systems are used to determine and distribute the available water to the accounts of water access entitlement holders for use. In some circumstances, users can also choose to "carry over" water from one year to the next. Water users can secure high- and low-security entitlements under the legislative regimes of each state, and local water sharing plans may provide some further specification of the priority of particular groups of entitlements or uses in each year.<sup>65</sup> Although the Australian allocation system provides more flexibility than the systems in Alberta and Colorado, the National Water Commission has observed that current allocation systems have been designed primarily to suit the demand pattern of the irrigation sector rather than environmental water holders, and that environmental uses received lower allocations than consumptive uses during the recent drought.<sup>66</sup>

The Council of Australian Governments' 1994 Strategic Framework on Water Reform committed the states and the Commonwealth to a market-based water reform and sustainable development in water management.<sup>67</sup> The framework was refreshed and augmented by the *National Water initiative* in 2004, in which each state government committed to, among other matters, preparing water plans with provision for the environment, dealing with over-allocated or stressed water systems, introducing registers of

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water, that are "inherently susceptible to change or termination" rather than a "property right": *ICM* at [144]. The mere termination of the right was not enough to fall within s51(xxxi); under which there must be an acquisition "whereby the Commonwealth or another acquires an interest in property, however slight or insubstantial it may be": *ICM*, at [147]. See generally Justice Rachel Pepper, "The Constitutionalisation of Water Rights: Solution or Levee?" (18 February 2011).

<sup>63</sup> NWC, above note 8, 11.

<sup>64</sup> Schedule B(i) Glossary of Terms, *Intergovernmental Agreement on a National Water Initiative*.

<sup>65</sup> The National Water Commission notes that: "a water user with relatively fixed water demands may choose high-reliability entitlements while a water user with water demands that are more flexible may choose a greater proportion of lower reliability entitlements": NWC, above note 8, 12. The National Water Commission notes that the market is predominantly made up of water entitlements and water allocations, and that the lack of use of futures, options, leases and the like is probably attributable to the range of water entitlement types and allocations on the market: National Water Commission, *Water allocation systems: exploring opportunities for reform*, Waterlines Report Series No 65 (November 2011), 12.

<sup>66</sup> National Water Commission, above note 65, 3.

<sup>67</sup> Vicki Waye and Christina Son, "Regulating the Australian Water Market", (2010) 22(3) *Journal of Environmental Law* 431, 434.

water rights and standards for water accounting and expanding the trade in water.<sup>68</sup> The Initiative was driven by the desire to “balance the need for secure property rights (which give water users confidence to invest) with the need for adaptive management of the environment as scientific knowledge improves over time”.<sup>69</sup>

Rapid decline in the riverine environment within the Murray-Darling Basin and mounting pressure on government to provide water security resulted in the development of the *Water For Future* program and the enactment of the *Water Act 2007* (Cth). This was followed by an intergovernmental agreement between the Commonwealth and the Murray-Darling Basin States, and the referral of state legislative powers to the Commonwealth in order to make particular amendments the *Water Act*.<sup>70</sup> This was an extensive Commonwealth intervention into water management, and one in which the Federal Government moved from coordinating and facilitating water reform to intervening in and managing the process.<sup>71</sup>

The Water for the Future strategy, on which the Act is based, has three main elements. First the Basin Plan, to be implemented by the Murray–Darling Basin Authority (MDBA), which is designed to provide for the integrated management of MDB water resources and to set scientifically based sustainable diversion limits (SDLs). Secondly, buybacks of water entitlements for the environment by the Commonwealth Environmental Water Holder (under the Restoring the Balance program). Thirdly, investment in more efficient irrigation systems.<sup>72</sup> The effectiveness and efficiency of the latter component has been questioned by a number of analysts.<sup>73</sup> Nevertheless the Government has recently advised that, although Government spending on buybacks has to date exceeded that spent on infrastructure upgrades, the funding priority until 2015 will now be infrastructure.<sup>74</sup> This Part of the Paper will introduce the Basin Plan and buyback components of the strategy, and the potential role

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<sup>68</sup> *Intergovernmental Agreement on a National Water Initiative* (2004); Department of Sustainability, Environment, Water, Population and Communities, “National Water Initiative” at <http://www.environment.gov.au/water/australia/nwi/index.html>. According to the National Water Commission “the NWI reflected concerns that variation in progress between regions and jurisdictions, and in developing an expanded knowledge base, meant that COAG’s objectives had not been fully achieved”: National Water Commission, above note 8, 50.

<sup>69</sup> In this context, risk assignment became a key issue: NWC, above note 8, 50.

<sup>70</sup> See Waye and Son, above note 67, 439, and Paul Kildea and George Williams, “The Water Act and the Murray Darling Basin Plan” (2011) Public Law Review 9.

<sup>71</sup> NWC, above note 8, 73.

<sup>72</sup> See NWC, above note 8, 75.

<sup>73</sup> See for example Productivity Commission, above note 37, at 124 and Lin Crase and Sue O’Keefe, “The paradox of national water savings: a critique of ‘Water for the Future’” (2009) 16(1) *Agenda* 45.

<sup>74</sup> Australian Government Response to the House of Representatives Standing Committee on Regional Australia’s Report *Of drought and flooding rains: Inquiry into the impact of the Guide to the Murray-Darling Basin Plan in Regional Australia* (November 2011), at 9; “The Basin Plan: Frequently Asked Questions”: Department of Sustainability, Environment, Water, Population and Communities at <http://www.environment.gov.au/water/basin-plan/faq.html>.

of infrastructure upgrades as a complementary measure to the Basin Plan will be addressed in the evaluation in Part 2.

**(i) The Basin Plan**

The proposed Basin Plan has been released by the Murray-Darling Basin Authority (MDBA) for public consultation until 16 April 2012. The purpose of the Plan is to “provide for the integrated management of all Basin resources in a way that promotes the objects of [the] Act”, including the establishment and enforcement of environmentally sustainable limits on the quantities of surface water and groundwater that may be taken from the Basin water resource.<sup>75</sup> The Plan also provides for the development of an efficient water-trading system across the Basin.<sup>76</sup> Importantly, the MDBA must set sustainable diversion limits (SDLs) on the quantities of groundwater and surface water that may be taken from the Basin, which must reflect the environmentally sustainable level of take and also be informed by socio-economic considerations. The Basin Plan will be implemented through water resource plans prepared by Basin States and provided to the Australian Government Minister for accreditation. In Australia it is considered best practice to rely on these water planning processes to address any environmental outcomes that could be affected by trading and the parameters in which water trading occur rather than provide conditions within the trading rules themselves.<sup>77</sup>

Considerable controversy has been generated by the proposed Basin Plan and in particular by the earlier *Guide to the proposed Basin Plan* released by the MDBA towards the end of 2010 in relation to the proposed SDLs. In the *Guide* the MDBA originally proposed cuts to consumptive use in the order of 3000 to 4000 GL/y, on the basis that, first, the long-term average volume of water provided to the environment would need to be between 22,100-26,700 gigalitres per year, or an additional 3000 to 7600 GL/y, of surface water, and, secondly, that these cuts would achieve acceptable social and economic impacts within the envelope of permissible environmental effects.<sup>78</sup>

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<sup>75</sup> Section 20.

<sup>76</sup> Waye and Son, above note 67, 439.

<sup>77</sup> However trades need to be approved by the Minister and Pt 11 of the proposed Basin Plan does contain provisions requiring the basin states to notify the MDBA of any restrictions on the free trade of water allowable for physical or environmental reasons (see cl 11.17 and 11.18), page xiii.

<sup>78</sup> Murray-Darling Basin Authority, *Guide to the Proposed Basin Plan*, xix and xxiii.

The furore generated by these proposed cuts, and the resulting debate between the Minister for Water and the former Chairperson of the MDBA as to the primacy of the Water Act's environmental objectives over its economic and social objectives, led to a different approach in the proposed Basin Plan and the communications surrounding its release. In the proposed Plan, the MDBA does not specify the total amount of water required for the environment, advising only that an additional 2,750 GL/y of surface water would be required to meet the environmental aims of the Water Act.<sup>79</sup> The Plain English summary to the Proposed Plan explains that the environmentally sustainable level of take reflects "a balanced judgement of environmental, socioeconomic and operational factors, and is based on evidence of future sustainability, rather than historic use".<sup>80</sup> In press releases the MDBA's current Chairperson has presented the MDBA's current approach to the setting of SDLs as an "adaptive management" approach, insofar as the MDBA has proposed that a review of the Basin Plan, including the SDLs, be undertaken in 2015. This review will take into account "works and measures, changes to river management, and advances in scientific knowledge".<sup>81</sup> The final application of the SDLs will be delayed until 2019.

**(ii) *Water purchases by Commonwealth Environmental Water Holder***

The Government has made a \$3.1 billion commitment over 10 years to buy water entitlements in the MDB for environmental purposes, which is to be used to ameliorate the impacts of the SDLs on irrigators, along with investments in water use projects. The Commonwealth Environmental Water Holder has been established to manage water purchased in the market, in line with the Environmental Watering Plan that forms part of the wider Basin Plan. As at 31 December 2011, about 1114 gegalitres of a mix of high and low-security water entitlements has already been acquired, and commentators have predicted that the Commonwealth Environmental Water Holder will become the single largest owner of water in the Murray-Darling, controlling up to 20 percent of extractive water rights.<sup>82</sup>

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<sup>79</sup> The Plain English summary of the proposed plan explains that, of this amount, 1,068 GL/y has already been recovered through buyback and infrastructure improvement schemes and a further 214 GL/y has been announced recently, leaving 1,468 GL/y to be secured: vii; see Chris Schultz and Fergus Green, Allens Arthur Robinson, "Focus: Draft Murray-Darling Basin Plan Released" (1 December 2011).

<sup>80</sup> Plain English summary of the proposed plan, above note 79, vii. See also Schultz and Green, above note 79.

<sup>81</sup> Plain English summary of the proposed plan, explanatory note.

<sup>82</sup> Australian Farm Institute, *Making Decisions About Environmental Water Allocations* (June 2010), 3. See also Lin Crase, Brian Dollery and Sue O'Keefe, "Managing Environmental Water: Lessons in Crafting Efficient Governance Arrangements" (2011) 30(2) *Economic Papers* 122.

Moves to impose an SDL on the Murray-Darling Basin have caused a great deal of anxiety on the part of irrigators as to the possibility of uncompensated reductions or compulsory acquisitions of water entitlements.<sup>83</sup> The NWI had originally sought to provide some clarity around the issue through a risk assignment framework, which set out how these risks were to be shared between water access entitlement holders, state and territory governments and the Australian Government. However these concerns have been addressed to a large extent by Government announcements that any discrepancy between the existing buyback program and the final SDLs will be met through infrastructure upgrades and further entitlement purchases from willing sellers.<sup>84</sup> The Australian Government has proceeded with buybacks of entitlements and infrastructure investments prior to the setting of SDLs on the understanding that the SDLs would be significantly lower than current levels of extraction.<sup>85</sup>

## **2. Preliminary observations regarding regulatory approaches**

It is difficult to provide a definitive evaluation of the three market-based approaches to the restoration of rivers and enhancement of freshwater ecoservices, as two of the regimes are still in their very early stages. However some preliminary observations can be made from the comparative analysis that will benefit from further consideration and research. In particular four key lessons have emerged from the analysis that can inform the design and implementation of regimes to promote environmental objectives.

### ***(a) The need for a blueprint***

Under the Colorado system, the state has not intervened to set specific parameters for environmental water requirements. Rather, the system is built on a voluntary approach that enables market transfers to shift traditional consumptive uses to instream uses, and is consistent with the principles of the prior appropriation system.<sup>86</sup> This flexible and voluntary approach is also piecemeal and unplanned, which renders the environmental outcomes of the Instream Flow Program less certain. The Program is not working towards any quantifiable or qualitative goal, and a recent study has indicated that there is currently no

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<sup>83</sup> NWC, above note 8, 85.

<sup>84</sup> See NWC, above note 8, 85.

<sup>85</sup> NWC, above note 8, 77.

<sup>86</sup> Loehman and Charney, above note 13, 891.



agreement on the specific quantities of water that will be needed to satisfy consumptive and non-consumptive uses in the future.<sup>87</sup>

If a transparent blueprint is not in place then there is a risk that the water allocation system may place a higher priority on consumptive uses, and/or be more vulnerable to capture or frustration with vested interests. The CWCB, a state agency, makes the decision as to whether or not, and to what extent, instream flows will be established at all, and whether or not to make a “call” on the river in order to protect instream flow rights.<sup>88</sup> By allowing the appropriation of minimum stream flows “to preserve the natural environment to a reasonable degree”, the legislation would seem broad enough to warrant CWCB’s intervention to establish flows for water quality and other environmental purposes.<sup>89</sup> However CWCB has interpreted the purposes for which instream flow rights may be acquired very narrowly.<sup>90</sup>

Any blueprint also requires a proper political commitment in the form of a realistic estimate of the funding required both in the short and the long term. In particular, for the program to be effective, environmental interests should be funded at a level equal to or greater than that of other water rights in the marketplace.<sup>91</sup> In Colorado, many streams were already fully appropriated by senior users at the time the instream rights were acquired. Accordingly, a stream may have an instream flow right but be effectively “dried up” by the exercise of senior water rights.<sup>92</sup> The CWCB can look to appropriate or lease these senior rights; however critics question whether legislative bodies will consistently approach funding, given the “myriad of other powerful interests vying for fiscal attention”.<sup>93</sup> Perhaps of more immediate importance is the observation that the ISF Program is inadequate on account of the rising demand for water for domestic uses, the cost of more secure water rights or leases, and limited funding for instream flows.<sup>94</sup> In particular, the US \$1 million a year that may now be allocated to the CWCB, along with donations received, is considered by commentators to be an insufficient amount to cover the eight major river basins of

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<sup>87</sup> Colorado Water Conservation Board, above note 12, ES-40; Charney, above note 25, 17.

<sup>88</sup> Benson, above note 25, 1289.

<sup>89</sup> Benson, above note 25, 1291.

<sup>90</sup> Benson, above note 25, 1291.

<sup>91</sup> Jones and Cech, above note 24, 253.

<sup>92</sup> Benson, above note 25, 1291.

<sup>93</sup> Jones and Cech, above note 24, 253.

<sup>94</sup> Loehman and Charney, above note 13, 876.

Colorado, particularly when you compare this to the \$3.1 billion dollars committed for the same purpose in Australia.<sup>95</sup>

**(b) *The need for a robust process in determining environmental limits***

The importance of setting the environmental parameters of the allocation system, and getting those parameters right, is widely acknowledged. A report for the Australian National Water Commission has concluded that one of the “universal prerequisites” for water markets is “setting an effective cap on total sustainable extractions (preferably before scarcity becomes acute)”.<sup>96</sup> In particular:

Markets should be established based on a clear definition of the total resource available for consumptive use and how it could change over time. This will influence the overall development of water-reliant industries. If such limits do not reflect the agreed sustainable level of extraction, there is likely to be unacceptable environmental degradation and pressure to move extraction to within limits that reflect the community’s desire for environmental outcomes. This creates uncertainty for water-using industries, which reduces their incentive to invest efficiently.<sup>97</sup>

However early indications are that decision-makers have been prepared to read ambiguities into the legislative frameworks in order to achieve politically acceptable outcomes.<sup>98</sup> In particular, the setting of both SDLs in the MDB and WCOs in Alberta has raised questions as to the extent that economic and social objectives can be weighed in the statutory decision-making process.

**(i) *Alberta***

In Alberta, the South Saskatchewan Water Management Plan included a number of WCOs for different rivers in the South Saskatchewan River Basin (SSRB). The WCOs were set at roughly 55% of the instream flow need in order to achieve an “acceptable and realistically achievable long-term compromise between two extremes of consumptive use of all of the water and a natural aquatic environment”.<sup>99</sup> However neither the operative section for WCOs nor their definition seem to provide scope for economic and social factors to be

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<sup>95</sup> Loehman and Charney, above note 13, 876.

<sup>96</sup> NWC, above note 8, 118.

<sup>97</sup> NWC, above note 8, 10.

<sup>98</sup> See for example Bankes, above note 43, 87.

<sup>99</sup> Michael M. Wenig, Arlene J. Kwasniak and Michael S. Quinn, “Water Under the Bridge? The Role of Instream Flow Needs (IFNs) Determinations in Alberta’s River Management”, in H. Epp and D. Ealey, *Water: Science and Politics* (Edmonton, 2006), 22, citing Alberta Environment, *Approved Terms of Reference Phase Two Water Management Plan for the South Saskatchewan River Basin* (2003).

considered, and instead the process contemplated by the Act is related to the achievement of environmental objectives only.<sup>100</sup> Nigel Bankes has suggested that given the approach taken by Alberta Environment it may not be possible to rely on WCOs to “establish the necessary ground rules within which a market may operate since they may not be stringent enough”, particularly given that WCOs can provide an effective limit to the acquisition of instream flows by Government and are a discretionary matter to be taken into account in the case of licence applications, transfers and renewals.<sup>101</sup> In any case, major water users in Alberta have sought to circumvent the implementation of water management plans through entering into negotiated agreements with the Government in order to protect instream flow needs.<sup>102</sup>

There is some scope to provide for any shortfalls in environmental water requirements through the conservation holdback. This mechanism has been described as a key to “unlock an otherwise intractable problem”, particularly if the held back water can devote water to instream flows with a senior licenced priority.<sup>103</sup> However it is unlikely to result in any significant instream flow restoration. The Director’s decisions as to whether to allow a transfer and whether to require a holdback are both discretionary, and the amount licenced may be limited to the amount required to satisfy established water conservation objectives, which in the SSRB are not considered to be sufficiently rigorous.<sup>104</sup> Most importantly, the mechanism may only be exercised if there is a transfer, and from 1999 to 2009 there were only about twenty-eight transfers in the province.<sup>105</sup>

*(ii) Australia*

In Australia, adequate water planning was an issue even before the commencement of the

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<sup>100</sup> In particular, Alberta Environment’s interpretation has been challenged on the basis of the Act’s provisions that a WCO has to be, first, based on the information available to the Director, and second the amount or quality of water which is “necessary” to achieve the prescribed objectives. On a proper construction of the definition of WCO it is considered that the information requirements must relate to the legislated purposes for which a WCO is established, e.g. the Instream Flow Report prepared by the Department: Nigel Bankes and Arlene Kwasniak, Joint Submission on the Draft SSRB Water Management Plan (20 December 2005), 2.

<sup>101</sup> Bankes, above note 43, 96. The WCO licence has a junior priority as it is set at the date the WCOs are set, and therefore provides reduced protection for rivers, particularly given the government has not considered either cancelling outright or even reducing the allocations in licences issued before the Water Act was passed: Brandes et al, above note 5, 23.

<sup>102</sup> See Alberta’s Athabasca River Water Management Framework, which is a recent agreement between Alberta Environment and oil sands operators to limit water diversions, forming a “regulatory backstop that ensures the river’s ecological integrity is protected during oil sands development”: see “Overview document” at [www.environment.alberta.ca/01229.html](http://www.environment.alberta.ca/01229.html).

<sup>103</sup> Percy, above note 6, 2105.

<sup>104</sup> See Kwasniak, above note 42, 349.

<sup>105</sup> Kwasniak, above note 42, 349, citing Alberta Water Council, *Recommendations for Improving Alberta’s Water Allocation Transfer System* (2009), 9.

Basin Plan process, with the National Water Commission observing a “fundamental lack of agreement in regard to the sustainable levels of extraction in many systems” as a major contributing factor to “uncertainty amongst water access entitlement holders”.<sup>106</sup> Local water sharing plans often did not identify the status of systems and specify clearly those that are over allocated and/or overused, or establish clear and firm pathways for returning those systems to environmentally sustainable levels of extraction.<sup>107</sup> There have also been issues regarding the political acceptability of any measure in the nature of a clawback of entitlements, adjustment assistance and compensation<sup>108</sup>:

The de jure position of government was simple: ... licences entailed no permanent property right, so there was no legal requirement to compensate irrigators for water clawed back to provide sustainable environmental flows or for other purposes. However the de facto position facing regional water planners was that it was considered economically, socially and politically unacceptable to clawback more than a marginal amount of water without some form of adjustment assistance.

This tension persists in the current controversy surrounding the sustainable level of water extraction in the MDB, and whether environmental objectives have primacy under the Water Act or whether broader socio-economic considerations can be placed on an equal footing. The legal consensus regarding the correct interpretation of the Act appears to be consistent with statements of the former Chief Executive of the MDBA that “the environmental envelope” must be considered first, and then “where you land in that envelope is determined by economic and social issues”.<sup>109</sup> In particular, the Australian Government Solicitor (AGS) has advised that the purpose of the Basin Plan is to give effect to relevant international agreements, and that those agreements “establish a framework in which environmental objectives have primacy”.<sup>110</sup> The AGS also added that the objects of the Act should also be given effect to, where possible, within the Act’s mandatory requirements.<sup>111</sup> In particular, SDLs must be set so as not to compromise “key”

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<sup>106</sup> National Water Commission, *2<sup>nd</sup> Biennial Assessment of the National Water Initiative* (2009), 88.

<sup>107</sup> National Water Commission, *3<sup>rd</sup> Biennial Assessment of the National Water Initiative* (2011), 101-103.

<sup>108</sup> NWC, above note 8, 55; citing Gentle and Olszak, “Water planning: principles, practices and evaluation”, in Hussey and Dovers (eds), *Managing Water for Australia: The Social and Institutional Challenges*, (2007, CSIRO Publishing).

<sup>109</sup> Paul Kildea and George Williams, “The Water Act and the Murray Darling Basin Plan” (2011) Public Law Review 9, citing the Senate Environment and Communications Legislation Committee, Supplementary Budget Estimates (19 October 2010), 15.

<sup>110</sup> See Kildea and Williams, above note 109. Australian Government Solicitor, “The Role of Social and Economic Factors in the Basin Plan”, 25 October 2010, para 23. The AGS then went on to clarify that it would be an “over-simplification” to regard these international agreements as being concerned exclusively with environmental objectives as opposed to social and economic considerations, and those factors can be considered in the implementation of environmental objectives: para 11.

<sup>111</sup> Section 3(c).

environmental assets, and and an object relevant to determining which environmental assets are “key” is the object of optimising economic, social and environmental outcomes while giving effect to the relevant international agreements. “The MDBA and the Minister could not identify an environmental asset as key if this was not necessary to achieve the specific requirements of the Water Act (such as those under s21) and would have significant social and economic effects”.<sup>112</sup>

It would seem that the MDBA’s approach in setting the 2,750 GL proposed reductions in surface flows has been guided by a fairly liberal interpretation the AGS’s advice. According to the CSIRO’s 2011 *Science Review*<sup>113</sup>:

The modelled 2800 GL/yr reduction scenario considered by the panel does not meet several of the specified hydrologic and ecological targets. In some cases operational constraints prevent delivery of environmental water to meet targets implying that some of the current ecological targets are not consistent with unavoidable operational constraints. In other cases, the shortfalls against targets appear to be a result of (i) insufficient environmental water, (ii) shortcomings in modelling environmental flow regimes in the unregulated rivers of the Basin or (iii) a combination of these factors.

Further analyses, including modelling of water use reduction scenarios above the 2800 GL/yr scenario are required to more fully assess the reasons for the modelled shortfalls. Given the current evidence base the level of take represented by the 2800 GL/yr reduction scenario is not consistent with the hydrologic and ecological targets provided in the review.

The Wentworth Group considered that these findings were “consistent with the earlier analysis in the 2010 *Guide to the Basin Plan* that even with a 3,856 GL reduction there is high uncertainty that it would achieve the environmental water requirements”.<sup>114</sup> These uncertainties in regard to the environmental outcomes likely to be achieved under the Basin Plan have led to questions about the validity of the process undertaken and the conclusions reached by the MDBA.<sup>115</sup>

Problems in weighing and balancing decisions about appropriate allocations between consumptive and non-consumptive uses have been compounded by the sequencing of

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<sup>112</sup> AGS, above note 110, para 28.

<sup>113</sup> *Science Review of the Estimation of an Environmentally Sustainable Level of Take for the Kurray-Darling Basin* (November 2011), at 28

<sup>114</sup> Wentworth Group of Concerned Scientists, “Statement on the 2011 Draft Murray-Darling Basin Plan” (January 2012), 6.

<sup>115</sup> See Chris Schultz and Fergus Green, Allens Arthur Robinson, “Focus: Draft Murray-Darling Basin Plan Released” (1 December 2011)

reforms in Australia and Alberta. In Australia the process contemplated under the NWI was to return “all currently over allocated or overused systems to environmentally sustainable levels of extraction” before establishing a market.<sup>116</sup> However governments have moved to establish water rights and water trading ahead of the environmental restoration of the MDB, or the clarification of pathways for improving or protecting it, and this has significantly hampered the Basin Plan process.<sup>117</sup> The same problem also occurred in Alberta, where the government has sought to identify and protect protected flows after already creating a market in water. Commentators in Canada have observed that before the creation of the market the stakes were much lower, as water rights were tied to a particular property and particular uses and could only be realised upon the sale of a particular property.<sup>118</sup>

**(c) *The regulatory model should not assume perfect knowledge***

Even where environmental effects are appropriately provided for within the regulatory framework, scientists are concerned that the ability to implement and enforce water initiatives is beyond the capacity of available scientific knowledge.<sup>119</sup> However the model of regulation that has been applied to these market-based water allocation systems assumes perfect knowledge on the part of the regulator in choosing the level of, and the form of, government policy interventions to correct market failures. Knowledge needs in relation to the setting of SDLs under the Basin Plan, for example, include the impacts of climate change on water availability and the interaction between surface water and ground water.<sup>120</sup>

Reducing scientific uncertainty is often seen as a key means of achieving political consensus.<sup>121</sup> However this approach is more likely to be successful in the context of “tame” problems, where value judgements are not in dispute.<sup>122</sup> Scientists are concerned that conventional science assumptions and approaches are inadequate for addressing the wicked

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<sup>116</sup> Section 23, clause iv and X.

<sup>117</sup> Daniel Connell, Quentin Grafton and John Ward, Chapter 23 “The Case for a Revised National Water Initiative for Northern Australia”, in Northern Australia Land and Water Science Review (October 2009), 23-8.

<sup>118</sup> Bankes, above note 43, 94-95.

<sup>119</sup> Moya Tomlinson and Richard Davis, “Integrating science and policy for improved water management in Australia” (2010) 61 *Marine and Freshwater Research* 808.

<sup>120</sup> Tomlinson and Davis, above note 119, 809.

<sup>121</sup> Gywm Prins et al, *The Hartwell Paper: A new direction for climate policy after the crash of 2009* (May 2010), 18, <<http://eprints.lse.ac.uk/27939/>>.

<sup>122</sup> Tamer problems are those that can be delineated and solved by experts, e.g. determining to location of a food contamination outbreak: Sandra Batie, ‘Wicked Problems and Applied Economics’ (2008) 90(5) *American Journal of Agricultural Economics* 1176, 1177.

nature of environmental problems that arise when attempting to govern complex hydrological systems.<sup>123</sup> “Wicked problems” are<sup>124</sup>:

[D]ynamically complex, ill-structured public problems. The causes and effects of the problem are difficult to identify and model and they tend to be intractable and elusive because they are influenced by many dynamic social and political factors as well as biophysical complexities. Also, most wicked problems are connected to, or are symptoms of, other problems. As a result, there is no consensus on what exactly the problem is. Indeed, a wicked problem is not well understood until after formulation of a potential solution, and therefore, the problem definition tends to change over time. However, because of their complex interdependencies, wicked problems are never solved, but rather they become better or worse.

It has been observed that water management problems tend to be wicked, as solutions require interdisciplinary collaboration and “the integration of different types of knowledge to address a common pool resource”.<sup>125</sup>

***(d) The precautionary principle should be embedded in the legislation, along with opportunities for adaptive management***

The precautionary principle is ideally suited to the management of wicked environmental problems, and the MDBA is required to take it into account in the setting of SDLs under the Basin Plan.<sup>126</sup> A commonly-used formulation is as follows<sup>127</sup>:

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- i. careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- i. an assessment of the risk-weighted consequences of various options.

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<sup>123</sup> Batie, above note 122, 1176.

<sup>124</sup> Batie, above note, 122, 1176.

<sup>125</sup> Catherine Allen, “Can adaptive management help us embrace the Murray-Darling Basin’s wicked problems?” in Claudia Pahl-Wostl, Pavel Kabat, Jorn Moltgen, *Adaptive and Integrated Water Management: Coping with complexity and uncertainty* (Springer 2008), 63.

<sup>126</sup> Section 21(4), *Water Act 2007* (Cth).

<sup>127</sup> See the *Intergovernmental Agreement on the Environment* (May, 1992); section 6(2)(a) of the *Protection of the Environment Administration Act 1991* (NSW); *Telstra Corporation Limited v Hornsby Shire Council* (2006) 146 LGERA 10; [2006] NSWLEC 133.

The principle provides a guiding methodology for public decisions.<sup>128</sup> In the context of wicked environmental problems, adaptive management can be deployed in association with a precautionary approach to reduce scientific uncertainty. Under this approach environmental limits should not only be established within the water allocation frameworks, but also be regularly reviewed and not lock in allocations between consumptive and non-consumptive uses.<sup>129</sup>

Despite the MDBA's recent statements regarding the adoption of an adaptive management approach to the development of SDLs under the Basin Plan, the practical consequence of the arrangements under the Water Act is that the SDLs represent a fixed allocation to the environment.<sup>130</sup> In particular, the provisions for reviewing the Basin Plan would not seem to provide the feedback loop required for effective adaptive management of the MDB (even with a review in 2015), and the MDBA has chosen to specify SDLs by setting a volumetric amount rather than using one of the other, more flexible, methods for setting SDLs allowed by the Act.<sup>131</sup>

These factors have limited the capacity of the MDBA to provide an adaptive response under the Basin Plan. However, as Daniel Connell has observed, the provisions of the Water Act provide some scope for the Commonwealth Environmental Water Holder to achieve environmental flow targets in addition to SDLs.<sup>132</sup> Commentators have previously interpreted government announcements that the full volume of water required for the SDL would be met through Commonwealth buybacks as implying that the Government is treating the buyback as a mechanism to adjust to the SDL only, rather than a flexible mechanism under the Act to provide for additional water over and above SDLs.<sup>133</sup> However no such limitations are provided under the Act apart from any constraints that may be imposed by the Commonwealth, for example under the Environmental Watering Plan, and it is

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<sup>128</sup> Christopher Norton and Kathy Ridge, *Local Government, Planning and Environment NSW* (LexisNexis, Looseleaf), at [585,025]

<sup>129</sup> Lee Godden and Jacqueline Peel, *Environmental Law: Scientific, Policy and Regulatory Dimensions* (2009), 239.

<sup>130</sup> See generally Avril Horne, John Freebairn and Erin O'Donnell, "Establishing and managing the environmental water reserve – the interaction between different government policies", AARES 55<sup>th</sup> Annual Conference (February 2011), [ageconsearch.umn.edu/bitstream/100561/2/Horne.pdf](http://ageconsearch.umn.edu/bitstream/100561/2/Horne.pdf).

<sup>131</sup> Section 23(2): see Mike Young and Jim McColl, "Sustainable Diversion Limits: A plan for the Murray Darling Basin", Droplet No 19, 25 July 2011.

<sup>132</sup> Daniel Connell, "The Role of the Commonwealth Environmental Water Holder", Chapter 20 in Daniel Connell and R. Quentin Grafton (eds) *Basin Futures: Water Reform in the Murray-Darling Basin* (2011)

<sup>133</sup> Avril Horne, John Freebairn and Erin O'Donnell, "Establishing and managing the environmental water reserve – the interaction between different government policies", AARES 55<sup>th</sup> Annual Conference (February 2011), [ageconsearch.umn.edu/bitstream/100561/2/Horne.pdf](http://ageconsearch.umn.edu/bitstream/100561/2/Horne.pdf).



considered that the mechanism provides the Australian Government with some capacity to make up for any shortfalls in environmental water arising out of the Basin Plan process.<sup>134</sup>

In order for buybacks to be effective a number of governance issues will need to be resolved. The environmental entitlements purchased to date have not closely correlated with particular environmental objectives.<sup>135</sup> The purchase of existing entitlements, for example, may not be well suited to meeting the needs of many sites that require additional flooding.<sup>136</sup> At a more fundamental level, there have been concerns expressed regarding the highly centralised nature of the CEWH model, and its ability to manage substantial volumes of water across the basin. Preliminary suggestions are that the Commonwealth environmental water reserve may be more effective if it were devolved, for example to catchment management authorities or local water trusts.<sup>137</sup>

The buyback program may also be constrained by the Australian Government's recently stated policy position that the funding priority until 2015 will be infrastructure upgrades rather than water buybacks, and that the Government is to "put a pause on all non-strategic buybacks".<sup>138</sup> Analysts have criticised this approach to recovering environmental water on the basis that the cost of recovering water for the environment through infrastructure upgrades in most cases exceeds the cost for recovery through purchasing, and that the notion of a water "saving" produced by infrastructure upgrades is not a "true saving" when considered from a catchment perspective.<sup>139</sup>

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<sup>134</sup> Connell, above note 132.

<sup>135</sup> The Productivity Commission has observed that the objectives for *Restoring the Balance* were "multiple, poorly defined, and at times conflicting", and concluded that the objectives reasonably ascribed to the program might include: to help ease the transition to the lower levels of water availability likely under the Basin Plan; to provide some water for the environment, particularly to meet short-term needs; and to obtain water cost-effectively: Productivity Commission, above note 37, 15.

<sup>136</sup> NWC, above note 8, 78.

<sup>137</sup> See Professor Mike Young, "Managing Environmental Water", in Australian Farm Institute, *Making Decisions About Environmental Water Allocations* (June 2010), 51 and Lin Crase, Brian Dollery and Sue O'Keefe, "Managing Environmental Water: Lessons in Crafting Efficient Governance Arrangements" (2011) 30(2) *Economic Papers* 122.

<sup>138</sup> The Hon. Tony Burke, House of Representatives Hansard, 28 February 2012, at 5. In response to the Windsor Inquiry's recommendation that the Government take a more strategic approach to water purchases that minimises impacts on communities, the Government has decided to prioritise spending in the short term on infrastructure upgrades: Australian Government, above note 74. According to the Department of Sustainability, Environment, Water, Population and Communities: "The Government has announced it is not considering general tenders in the southern connected system before 2013. Until then, buyback will focus on targeted purchases and water purchases associated with subsystem retirement and reconfiguration. There is also scope to improve the efficiency of water use and delivery through changes to river operations and environmental works and measures": see <http://www.environment.gov.au/water/basin-plan/faq.html>.

<sup>139</sup> The Productivity Commission, above note 37, at 124 observes that:

From the perspective of an individual irrigator, or an irrigation infrastructure operator, it can be reasonably straightforward to define and measure water savings that arise from upgrading irrigation infrastructure or changing management practices... Complexities arise, however, when water savings are looked at from a catchment perspective (as is necessary in managing the Basin's water resources)...[The] water 'saved' might otherwise have ended up as a mix of return flows to a river, recharge to

## Conclusion

The transition of a number of jurisdictions to a market-based water allocation regime has involved an associated transformation of the functions of the state, from one of provider of water services and supply to that of a regulator. However, while a market approach can have some utility in the implementation of environmental flows, water trading always occurs within the context of a wider governance regime, and that regime needs to establish effective and sustainable limits to consumptive water use. This Paper's preliminary analysis indicates that none of the jurisdictions have reached a point where water markets are operating within sustainable parameters.

Establishing the limits of the market is a political decision, not a decision that should be left to market resolution because of the significant externalities involved and the need to balance economic, social and environmental benefits. However, the reform processes within Alberta and Australia in particular have demonstrated that politics is less about maximising rationality and more about "finding compromises that enough people can tolerate to allow society to take steps in the right direction".<sup>140</sup> John Quiggan has summarised the current situation in Australia very well<sup>141</sup>:

The process set in train by the Water Act of 2007 has failed in the most important respects. Instead of an evidence-based policy, we have a political compromise which will yield inadequate flows in the river system, whilst wasting billions on low-value infrastructure projects. Nevertheless, while the target of 2750 GL is disappointing, it is important to remember that, less than a decade ago, the members of COAG could not even agree on a saving of 500 GL.

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groundwater, water entering a local wetland and evaporation. Not all of these represent true savings at the catchment scale. However the Murray-Darling Basin Authority currently recommends that "that water be recovered as much as possible through infrastructure upgrades rather than buybacks" : see <http://www.mdba.gov.au/draft-basin-plan/mythbusting#government-will-force-farmers>. Socio-economic analysis supporting the draft Basin Plan states that:

"While investments in irrigation efficiency have a higher budgetary cost than buyback in terms of the volumes of water recovered, investments could also generate wider economic benefits such as:

- maintaining or increasing existing productive capacity in the irrigation district, thus mitigating flow-on effects associated with water purchases
- higher levels of service in water delivery, which can promote greater productivity on-farm and enhance the productive capacity of the regional economy
- greater benefits under drought conditions, where evaporation and transpiration losses would otherwise be higher
- short-term construction benefits in the region from the works required."

See Murray-Darling Basin Authority, *Socioeconomic analysis and the draft Basin Plan* (November 2011), at 127-128.

<sup>140</sup> Prins et al, above note 121, 18.

<sup>141</sup> Australian Science Media Centre, "Rapid Reaction: Draft Murray-Darling Basin Plan released – experts respond", 28 November 2011, [www.aussmc.org/2011/11/rapid-reaction-draft-murray-darling-plan-released-expert-responds/](http://www.aussmc.org/2011/11/rapid-reaction-draft-murray-darling-plan-released-expert-responds/)

Regulated market-based allocation frameworks have certainly started a process of redistribution, and also buy-in by consumptive water users into a more sustainable framework. However it remains to be seen whether the process can gain enough momentum to restore the health of water stressed and over allocated river basins. The examples have demonstrated that environmental objectives will not be achieved unless those objectives form part of an overlying blueprint for reform, but those objectives also need to be concrete and unambiguous, with clear pathways for implementation. Any ambiguities in the resultant statutory frameworks not only create uncertainties for investment but also provide the opportunity for vested interests to slow the momentum of the original political commitments.