

# Common legal and policy factors in the emergence of environmental water managers

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## Abstract

Environmental water managers (EWMs) are appearing in an increasing range of jurisdictions as a way of managing environmental water in the context of a water market. This paper demonstrates a correlation between these organisations and three legal and policy factors, which will be of interest to any jurisdictions seeking to use the EWM model in future.

*Keywords: environmental water, policy transfer, water market, water right.*

## 1 Introduction

Policy makers are increasingly aware that demand for water access and services continues to rise, but fresh water supplies are a limited resource [1]. As more water is extracted and diverted to meet private needs, there is less remaining in our rivers, wetlands and estuaries, and aquatic environments are suffering [2]. To combat this decline, many countries are developing laws and policies to set aside and protect environmental water, which is then used to provide flows essential for the maintenance of aquatic health. As with other rapidly developing policy areas, there is tremendous opportunity to learn from innovations elsewhere and for policy transfer between jurisdictions [3]. However, water resource management is heavily path-dependent and history matters [4]: an understanding of this history is essential for an effective policy transfer.

This paper examines the emergence of new organizations, environmental water managers (EWMs), which are taking responsibility for acquiring and managing environmental water (see, e.g. [5]). These organizations are often operating in the context of water markets, and may in some cases drive the development of such markets through their acquisition of environmental water via water right transactions [6]. EWMs are dedicated to the business of managing



environmental water to improve aquatic health, and can be highly effective in both procuring and managing environmental water [7]. EWMs may therefore be a helpful tool for other jurisdictions to consider in their search for sustainable water resource management solutions.

But policy transfer cannot occur without consideration of the legal and policy environment within which the policy originated [3]. This paper builds on the work of Garrick *et al.* [8], who identified three factors necessary (but not sufficient) to enabling water markets and environmental transactions: water rights and a cap on water extractions, recognition of the environment as a legitimate use and mechanisms to transfer water to the environment. This paper focuses on the organizations (EWMs) that emerge to hold and manage the environmental water, and identifies three legal and policy factors common to all jurisdictions with identifiable EWMs at present. A desktop review of other jurisdictions, based on these common factors, is used to demonstrate a strong correlation between these legal and policy factors and the emergence of EWM. In doing so, this paper provides an important first step in the identification of policy conditions necessary to enable the establishment of an EWM.

## **2 Environmental water: definition, provision and management**

Environmental flows are “the quality, quantity, and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems that provide goods and services to people” [9]. In this review, I use the term ‘environmental water’ to include both instream flows as well as water extracted for environmental purposes (such as wetland watering). This paper focuses on jurisdictions with water catchments that have insufficient water quantity to meet all needs, including those of the environment. Where there is no capacity to allocate additional water to other uses without compromising the reliability of supply for existing users, any recognition of environmental water requires the transfer of water rights from existing users to the environment.

Providing adequate environmental water to protect the health of aquatic ecosystems proceeds in three distinct phases: firstly, putting the policies and laws in place so that environmental water is legally defined; secondly, implementing these policies and laws so that environmental water is physically provided and protected; and thirdly, managing the provided environmental water efficiently and effectively, and showing that this investment in river and wetland health is delivering on its promises.

This third phase, environmental water management, includes both managing an existing portfolio of water rights in storage (e.g. in Australia, see [10]) and the process of securing ongoing instream flows through repeated transactions (e.g. in the US, see [11]). Following the acquisition of water for the environment (and often a large investment of funds), it must be demonstrated that this investment in environmental water has (1) seen increased water in rivers and wetland; and (2) been effective in improving the health of aquatic ecosystems. The idea that



environmental water can be used effectively *and* efficiently to achieve the desired outcome is still novel and difficult [12, 13], but is nonetheless important.

### 3 Environmental water management organizations (EWMs)

EWMs are found in 19 jurisdictions in Australia, the USA, Canada and Mexico (Table 1). The environmental water management organizations can be identified based on a set of common organizational features. Each EWM:

- 1) is an *identifiable* organization or agency (not wholly subsumed within a water regulator such as a government department, so that decision-makers are clearly identifiable);
- 2) has *specific objectives* relating to the achievement of defined aquatic environmental outcomes; and
- 3) has the *capacity and requirement to acquire and/or manage* water rights for the environment in order to achieve those objectives.

Table 1: Jurisdictions with environmental water management organizations.

Jurisdiction	Environmental Water Manager
Australia (Federal)	Commonwealth Environmental Water Holder (CEWH) and the Murray Darling Basin Authority (MDBA holds The Living Murray water) [14]
Australia: Australian Capital Territory	CEWH and MDBA [14]
Australia: New South Wales	RiverBank (OEH); Environmental Water Trust [15], Murray-Darling Wetlands Ltd [16]; water also provided by Healthy Rivers Australia, the CEWH and MDBA [14]
Australia: Queensland	CEWH and MDBA [14]
Australia: South Australia	Healthy Rivers Australia [17] and Water For Nature [18]; water also provided by the CEWH and MDBA [14]
Australia: Victoria	Victorian Environmental Water Holder (VEWH) [10]; water also provided by the CEWH and MDBA [14]
Canada: Alberta	Water Conservation Trust of Canada [19, 20]
Mexico	NGOs on transboundary rivers (e.g. Environmental Defense Fund and Pronatura Noroeste); World Wildlife Fund water trust on Rio Grande [21] and Colorado River Delta Water Trust [22]
USA: Arizona	Private (Nature Conservancy) [11]
USA: California	Federal (Dept of Interior Water Acquisition Program) and private NGOs (Sierra Water Trust, Sanctuary Forest Mattole Flow; Scott River Water Trust); previously the State Environmental Water Program [11, 23–25]
USA: Colorado	State (Colorado Water Conservation Board) and private (Colorado Water Trust) [11, 24]
USA: Idaho	Statutory instream water flows in Snake River and Lemhi River (local Lemhi water bank) [11, 24]
USA: Montana	State (Montana Fish, Wildlife and Parks) and private (Trout Unlimited, Clark Fork Coalition) [11, 24]
USA: Nevada	State Department of Wildlife permanent water purchase program, National Fish and Wildlife Foundation Walker Basin Program [11, 24]
USA: New Mexico	Middle Rio Grande Endangered Species Collaborative Program [26]
USA: Oregon	Freshwater Trust, Deschutes River Conservancy, Klamath Basin Rangeland Trust [11, 24]

Table 1: Continued.

Jurisdiction	Environmental Water Manager
USA: Texas	State (Texas Water Trust) and private (specific river NGOs leasing water as well as river rehabilitation) [11, 24]
USA: Utah	Private (Utah Trout Unlimited) [27]
USA: Washington	State (Dept of Ecology established state government water trust) and private (Washington Water Trust and other NGOs) [11, 24]

The proliferation of these organizations around the world indicates their usefulness in obtaining and managing environmental water, including deciding where to use it, whether to sell it and how to obtain the required flows at the right time of year, using a combination of temporary and permanent transactions [5, 6]. Based on this review, I found only one case of an extant environmental water manager ceasing operations, and this was the Californian Environmental Water Program [23], which was discontinued after new regulations provided lower cost environmental protection. As more countries turn to water markets as a way of increasing water use efficiency and managing water during drought, it seems likely that the EWM model will continue to be used to protect and manage environmental water in the context of the water market.

#### 4 Legal and policy factors correlated to the emergence of environmental water managers

This paper aims to establish a correlation between the emergence of EWMs and the presence of a set of legal and policy factors. Evidence of correlation is the first step towards establishing a causal relationship [28], but establishing causation can be exceedingly difficult and expensive, especially when considering social factors co-occurring in different contexts [29]. Demonstrating correlation is important to show that (1) it is worth investigating causation; and (2) in the short term, these factors are likely to be of interest to policy makers in examining how they might use the EWM model in their own water regimes.

##### 4.1 Jurisdictions with EWMs: the three common factors

In all instances where EWMs were located (Table 1), three legal and policy factors were present:

- (1) Modern water rights (as defined by [30]): transferable property rights in water held by individuals, separately from land;
- (2) Water markets: a cap and trade scheme; and
- (3) Legal rights to water for the natural environment, so that the natural environment is legally recognized as a legitimate user of water.

In each case, each factor was substantially implemented, as evidenced by the following:

- (1) For modern water rights: a public register of water rights, where each water right is clearly defined in terms of reliability, security and ownership;



- (2) For water markets: active markets with public exchange platforms, or at the very least, a volume of environmental water transactions demonstrating a clear willingness to trade;
- (3) For environmental water rights: at least some of the environmental water has clearly identified rights for the environment with the same legal protections and capacities as other users' water rights.

#### 4.2 Demonstrating correlation: methods

The evidence of correlation between the three factors and the creation of an EWM was gathered using a desktop review of the available information on (1) extant EWMs and (2) legal and policy conditions in countries with a water resource management regime. This review was conducted using a two-step process, and based on information in the public domain.

The first step identified countries (and, where relevant, states and provinces within them) meeting condition 1 (modern water rights), based on a review of the WaterLex database [31], other international reviews [4, 30, 32] and unpublished research conducted by the University of Melbourne Law School Library [33]. It is acknowledged that this review may not identify all jurisdictions that meet factor 1, because:

- 1) new policies, laws and institutions are being created all the time;
- 2) the WaterLex database is compiled based on submissions from member countries, and is unlikely to be completely comprehensive, and other sources were used to help correct this; and
- 3) informal water trading occurs in some jurisdictions without formal legal acknowledgement and recognition.

However, this review represents the best available public information.

The second step tested whether these jurisdictions had the remaining factors. Internet searches (Table 2) were conducted using Google (for general information, NGO and government websites, as well as publicly available literature) and the University of Melbourne Library 'Discovery' search (for academic literature) [34].

Table 2: Search terms for each factor.

Condition	Search terms
1 – transferable property rights separate from land	N/A (see above discussion)
2 – water markets	[jurisdiction name] + “water markets” [jurisdiction name] + “water trade” [jurisdiction name] + “water transfers”
3 – environmental water rights	[jurisdiction name] + “environmental water” [jurisdiction name] + “environmental flows” [jurisdiction name] + “instream flows” [jurisdiction name] + “water conservation”
Presence of EWM (this search was only conducted if the EWM had not been already identified; see specific references in the following tables)	[jurisdiction name] + “environmental water management” [jurisdiction name] + “NGO environmental flow” [jurisdiction name] + “water conservation licence”



### 4.3 Results: correlation between the EWMs and the three factors

This review demonstrates a strong correlation between the presence of the three legal and policy factors and the operation of an EWM. Based on the review, 60 jurisdictions (countries and states/provinces within them) recognize a water use right that is transferable and separate from land (modern water rights). As discussed above, all three factors are present where EWMs exist today.

Of the 60 jurisdictions identified in this review with modern water rights, 41 do not have an EWM (Table 3; see Appendix A). These jurisdictions have some form of legally transferable property right to water (although in some cases this has not been completely separated from land and use specifications), but do not have an active water market (in some cases it is absent entirely; in others there is very low levels of activity), or they do not provide adequate legal protection for environmental flows, or both. None of these jurisdictions has an EWM, which provides the strongest evidence of correlation between the three factors and the operation of EWMs.

## 5 Discussion

This review establishes a clear correlation between the presence of modern water rights, water markets, environmental water rights and EWMs. In the absence of a clear causative relationship, it is worth considering why these factors might be necessary for the emergence of an EWM.

Firstly, modern water rights are essential for the transfer of rights to the environment. As discussed above, this is critical for the provision of environmental water in highly allocated catchments; especially under prior appropriation water regimes, as transfer of water rights enables the environment to obtain the more reliable senior water rights. Further, transferability is essential for management, as it enables an EWM to manage a portfolio of water rights over time.

Secondly, active water markets can create opportunities in both the implementation and management phases, by providing a mechanism to obtain environmental water from willing sellers [8]. Management options are enhanced, as water rights can be sold in one catchment and purchased in another, where they are of greater value to the environment, or converted to funds that can be invested in complementary river health works. With this increase in flexibility comes greater responsibility for the environmental water manager to make the right decisions. Water markets create opportunities for environmental water management, but they also require environmental water managers that can operate effectively within them. EWMs can (1) participate in the water market on an equal footing with other water right holders (without distorting the market); (2) facilitate transactions to recover and manage environmental water when water markets are relatively inactive; and (3) operate as a water manager, rather than a water regulator, in order to obtain the trust of willing sellers. This becomes especially important when the water market itself is driven by



environmental water transactions, see [24]. Two examples are Washington State and Montana, which have low levels of water market activity overall, but successful EWMs and environmental water recovery programs [11, 24, 35]. Whilst an active water market may be necessary to provide flexibility for the long-term management of a water portfolio, EWMs can also drive the creation and activity of water markets, in order to access the water they need. What is essential is the willingness of other water users to participate in water trades; when water markets are relatively inactive, this willingness to trade may be considered a proxy for the presence of an active water market.

Finally, environmental water rights that are legally similar to the rights of other users are necessary to enable the environment to purchase water (an essential step for the provision of environmental flows in highly allocated catchments) and to protect it once purchased. When all rights to water are legally the same, it's easier for the environment to take advantage of the existing legal frameworks that protect the rights of other water users (see discussion in [10]).

## 6 Conclusions

This review provides establishes a strong correlation between the existence of EWMs and the substantial implementation of modern water rights (tradeable rights that are held separately to land title and use permits), active water markets (or a demonstrated willingness to sell) and legal protection of environmental water rights with the same sorts of legal capacities as water rights held by other users in that jurisdiction.

In a path-dependent field such as water resource management, understanding the necessary conditions that make a policy reform successful is paramount to the success of transferring any such policy to a new jurisdiction. As more countries implement environmental water policies, often alongside reforms to establish and encourage water markets, it is likely that more environmental water managers will emerge. Given that causation may be difficult to establish (although it is the logical next step), the strength of this correlation and the reasons for accepting this relationship may assist policy transfer. For jurisdictions without EWMs at present, this paper provides an indication of the policy and legal reforms they need to investigate (and possibly implement) in order to support the operation of an EWM.

## Appendix A

Information on the presence of each of factors 1-3 is indicated by a 'Yes' or 'No' in each of the labelled columns. Where the implementation of each factor has only been partially achieved, this is indicated by further qualifications described in each case. More detailed analysis of the factors is available on request from the author (or by reference to the sources listed).



Table 3: Jurisdictions without EWMs.

Jurisdiction	Modern water rights	Water markets	Environmental water rights
Australia: Northern Territory	Yes [36]	No [36]	No [14] but environmental water plans
Australia: Tasmania	Yes [37]	Partial [36]	No [14]
Australia: Western Australia	Partial [38]	Partial [36]	No [14]
Burundi	Yes – Water Law 1992, Art 35	None	None
Cambodia	Yes [31]	None	No [39]
Canada: British Columbia	Yes – Water Act 1996	None	Yes [40] see also Fish Protection Act
Canada: Nova Scotia	Yes [41]	None	Partial [40] habitat protection as part of licence
Canada: Nunavut	Yes [41]	None	No [40]
Canada: Ontario	Yes [41]	None	Yes [40]
Canada: Saskatchewan	Yes [41] only for original purpose	None	No [40]
China	Partial [32]	No [4]	No [4, 21] but underway
Chile	Yes [31]	Yes [4, 42]	Partial [43] implementation incomplete
Ethiopia	Yes [31]	None	No [44] limited implementation
Ghana	Yes [31]	None	Partial [44] minimum flows from dams (e.g. Volta Basin)
Guinea	Yes [31] only with original conditions	None	No (except as multi-country agreements)
Honduras	Yes [31] for irrigation purposes	None	Partial [45] minimum flows on a case by case basis (new dams)
Italy	Yes [31]	None [46]	Yes [47]
Japan	Yes [31]	None	No [21]
Kyrgyzstan	Yes, but not irrigation – Water Code 2004	None [48]	No [49, 50]
Lithuania	Yes [31]	None	Partial (minimum flows at dams and EU Water Framework Directive)
Mali	Yes [31]	None	No
Namibia	Partial [31] only conserved irrigation water	No	No [51] no implementation
Nepal	Yes [31]	None	No [52] new hydropower starting to require minimum flows
Netherlands	Yes [32]	None	Partial: EU Water Framework Directive to protect aquatic ecosystems
Peru	Yes [31]	None [53]	Yes [54] but limited implementation
Portugal	Yes [31]	None [55]	No
Slovenia	Yes – Water Act 2002, Art 121	None	No [56]





Table 3: Continued.

Jurisdiction	Modern water rights	Water markets	Environmental water rights
Spain: Canary Islands	Yes [31]	Yes [57]	Partial [58] implementation incomplete
South Africa	Yes [32]	Yes [4, 59, 60] active markets in local areas only	Yes [4, 61] implementation incomplete
Tunisia	Partial [31] Concessions can be transferred but not water use rights	No [62]	No
United Kingdom	Yes [31] but requirement to use same specified abstraction point	No [63] Extremely minimal trading	Partial: protection of instream flows via licence conditions, but environmental flows quite different to irrigator rights
Uruguay	Yes [31]	No	No
USA: Alaska	Yes [31] – Alaska Statutes	None [64]	Yes [40]
USA: Arkansas	Partial [65] 'excess' surface water can be transferred	None	Partial [66] Minimum flows protected when issuing permits
USA: Hawaii	Yes – Hawaii Revised Statutes Annotated §174C-59	None	Yes [67]
USA: Indiana	Yes [31]	No [35]	No [40]
USA: Kansas	Partial – Water Appropriation Act 1945	Yes [35] but not very active	Yes [40]
USA: Kentucky	Yes – Kentucky Revised Statutes §151.150, 140	None	Yes [40, 68]
USA: Nebraska	Partial – Nebraska Revised Statutes §46-233, 241, 242, 249	Yes [35] but not very active	Yes [40]
USA: Oklahoma	Legislation silent on transfer	Yes [35] but not very active	No [69]
USA: Wyoming	Yes – Wyoming Annotated Statutes §41-3-101	Yes [35] but not very active	Yes [40]

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