Submission to the public inquiry into National Water Reform

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Property rights

- *What further actions are needed to achieve clear and secure property rights?*

As a first step, the Productivity Commission should consider whether water rights should be given the formal status of property rights. In 2006, Douglas Fisher characterised this as a debated between whether the 'private property regime a fictitious instrument for managing resources or a recognition of full beneficial ownership?' (Fisher, 2006).

Water resource management frameworks make much use of legal constructs that can be property rights, or can be rights which resemble property rights. Whilst the market can accept some forms of legal fiction in order to operate, the stability of property rights becomes critical when considering the right of the state to take such property, and whether compensation is payable.[1] If the state can define the rights, but can also change the rules without compensating the owners of such rights, then the market will be undermined (Anderson and Libecap, 2014).

Economic analysis places a greater emphasis on the functionality of the property right within a market; whereas the law emphasizes the legal rights attached to the property. Thus, whilst the economic elements of property rights will often overlap with legal elements, they are different frameworks, and the differences between an economically acceptable property right and a legal property right can be quite profound.

The law defines property rights as *in rem*: good against all the world, and these rights are "vested in a clearly identifiable person or institution" (Fisher, 2004). As a result, property rights are extremely valuable, and the state would be wise to be somewhat wary in creating them. Fisher (2004) defines the legal characteristics of property as:

- the right can be enforced by the legal system;
- the substance of the right can be defined and identified;
- the right is exclusive to the holder of the right;
- the right is sufficiently permanent and stable to attract a sufficient degree of security; and
- the right is able to be transferred.

Economic analysis focuses on three of these elements: exclusivity, transferability and enforceability, and importantly, property rights are seen as the mechanism through which

[1] In the USA, this is referred to as 'takings protections' under the US Constitution, CAA §403(f), 42 U.S.C. §7651b(f). In Australia, there is a provision in the Australian Constitution which requires any taking of property to be compensated on just terms, s51(xxxi).

economically efficient resource allocation can be achieved (Tietenberg and Lewis, 2006). Exclusivity of property reduces the capacity for externalities: the consequences of one person's actions which are felt not by the actor, but by another uninvolved person. Transferability enables shifts from low value to high value uses, to achieve Pareto efficiency. Enforceability ensures that individuals will invest in their own property, to maintain its value over the long term. But economic analysis recognizes that property rights are only part of the equation: the other element is transaction costs (Coase, 1960). As a result, it is possible to trade off some of the legal elements of the property right, provided that (a) the construction remains consistent within the market framework and (b) that the state is not actively undermining the value of those pseudo-property rights by altering them without compensation.

- *What steps have been taken — or should be taken — to:*
  - *unbundle entitlements in unregulated surface water and groundwater systems?*
  - *incorporate all water uses (for example, the mining industry) within the one planning framework?*

The rights of existing water users and the environment are only protected if the entire water resource is accounted for within a single planning framework. There are particular challenges were groundwater and surface water systems are partially connected or there are significant time delays in the extraction impacts. There is also a need to more explicitly represent the current science around groundwater surface water interactions (and in particular "connectivity") within water planning and markets. This is particularly relevant for mining where the timing of extractions and the implications for other water users are not always instantaneous, and the volumes extracted are considerable. There have been various discussions around the concepts of Net Volume Licencing for mining, however there are significant challenges and very specific circumstances where this may be applicable (Graszkiewicz et al., 2013). In particular, issues of water quality and the ability to effectively re-charge aquifers need to be carefully considered.

- *What new water sources should be brought into a water entitlement process and why?*

See discussion under urban water services below

Water Planning

- *What are the key areas of water planning where further progress is required to achieve the objectives and outcomes of the NWI?*

One of the persistent challenges under the NWI is the establishment of legally secure and enforceable rights to water for the environment.

The Commonwealth environmental water buybacks have significantly increased the volume of held environmental water, but most environmental water is still planned environmental water.

Planned environmental water is set aside for the environment by the application of rules and other management procedures. Experience during drought showed that this water is most easily transferred away from the environment, and it does not have the same level of legal protection or enforceability as held environmental water (O'Donnell, 2012).

Converting as much of existing environmental water to held environmental water access entitlements will improve the flexibility and efficiency of environmental water management, as well as enhancing the legal security of these entitlements. However, it should be acknowledged that there are management costs associated with this change.

- *Is there scope to improve how water plans deal with long-term shifts in climate affecting resource availability? Are there recent examples of leading practice?*

There are three key areas where we believe that water plans could significantly improve in their consideration of climate impacts on resource availability.

1. Allocation mechanisms that consider climate variability and change

In many systems, the allocation between environment and consumptive users is based on an assessment of the long term historical streamflow record. However, in many systems where existing environmental allocation mechanisms are in place (i.e., caps or conditions on license holders), if there is a step shift in the overall water available in the system, the reduction in water availability will not be evenly shared between the environment and consumptive water users (CIRES, 2014). By setting the cap as a volumetric limit (rather than a proportion), the loss will be felt solely by the environment and not by consumptive water users. To demonstrate this using real data, consider the catchments of the MDB. The figure below shows projected reductions in water availability and surface water diversions under a median 2030 climate scenario for river catchments in the MDB (CSIRO, 2008). Slightly different allocation mechanisms for environmental water, and often a combination of multiple allocation mechanisms, are employed for each of these catchments. The majority of river catchments show that surface water diversions do not decrease at the same rate as the climate impacted reduction in water availability. The Ovens Basin, for example shows a 12% reduction in water availability, with no reduction in surface water diversions. This means that the 12% reduction is borne by the environment rather than shared across consumptive water users. The Gwydir Basin is the closest to having an equal reduction in water availability and consumptive use (around 10%), and it is the only catchment where, under current allocation mechanisms, the environment and consumptive water users would equally feel the impacts of climate change.

We are not taking a position here as to how water availability risk should be apportioned, but rather making a case that it should be explicitly considered in the water resource planning process (Horne et al., 2017a).

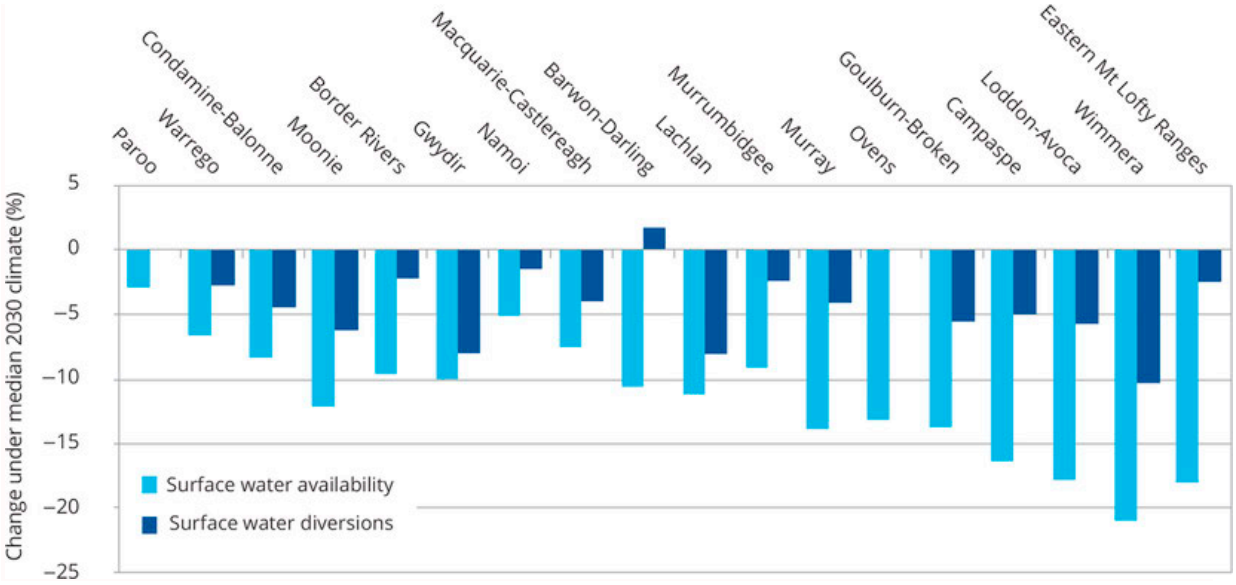

Figure - Impact of changed climate on water availability and surface water diversions for river catchments in the Murray–Darling Basin, Australia, for the median 2030 climate scenario. ***Source: CSIRO, 2008.***

2. Consideration of variability

The most commonly applied approach to assess climate impacts use ***scaled*** historical flow and assessed ***long term average*** annual impacts. This method assumes a constant, unchanging flow pattern (by applying multipliers to the historic flow pattern, whether they be seasonal or annual). However, we know that even without climate change, Australia's climate in highly variable. If current climate continues, the next 100 yrs could unfold very differently to the last 100 yrs and still be statistically indistinguishable from "historical" conditions. Climate change adds another level of uncertainty on the concept of natural variability.

Recent work has shown considering variability when looking at drought sequences or climate change is important for assessing environmental management objectives in the river system (Wang et al., in review, Wang et al., accepted). In the context of climate change, this highlights the importance of considering changes to the sequencing of flow (e.g. number and distribution of rain days) not just the scaling of historical flows.

Accordingly, to properly consider the likely future risks to water availability, we need to consider the impact of *natural variability* on both our *current* as well as *future* climates.

3. Consideration of changed catchment response

Existing research shows that following the millennium drought the rainfall runoff response in some catchments did not return to pre-drought conditions (Saft et al., 2016). Our water modelling and planning approaches are all based on the assumption of stationarity. Given that catchment behaviour has been shown to vary over time, the water planning process needs to be flexible enough to accommodate both changes in system behaviour, and changes in our knowledge of system behaviour.

One possible approach is to use modelling and decision making approaches that explicitly acknowledge uncertainty. Currently, we rely on "deterministic" modelling approaches, with little integration of uncertainty into the decision making framework.

- *How can the interests and needs of Indigenous people be better accommodated and represented in water planning processes?*

Current legal mechanisms providing for Indigenous water rights clearly do not effectively support the use of water by Aboriginal persons for commercial purposes, focusing instead on cultural and environmental interests (O'Neill et al., 2016). These are important values that merit protection, but a broader perspective that takes into account the history of exclusion from culturally appropriate economic opportunities in Australia is required (MacPherson, 2016). Aboriginal peoples' water rights should have the same characteristics as the rights to water that were available to non-Indigenous users since the time Australia was colonised, giving Aboriginal people the choice whether to exercise them for cultural or economic development purposes. This much, at least, appears to be contemplated in the white paper for developing northern Australia, which contemplates the use of water by indigenous people for commercial purposes.

Undoubtedly, the first step in adequately accommodating indigenous values is meaningful consultation; in order for non-indigenous water planners to better understand indigenous water perspectives (O'Neill et al., 2016). By and large, Aboriginal communities recognise a need for economic development (including via the exploitation of water resources) as providing employment and long-term viability for their communities, however, they are "they are very determined to protect their country and sacred sites" (Australian Law Reform Commission). Recent research by the Track project confirms the need for collaborative water planning processes to ensure Aboriginal and multiparty confidence in the water planning outcomes (Jackson et al., 2012).

Water Trading

- *Are there actions that governments should take to reduce costs and delays of trading water, including for inter-region and interstate trade?*

It would be helpful to have clarity around the differences between individual water trade decisions and the management of bulk water. There is an assumption in much of the literature that management of e.g. system losses, capacity constraints etc can occur through incentives (or delivery rights) to individual irrigators. Many decisions actually occur at the bulk water level and balancing (or "trade") at this level. Clarity around the role of bulk water decisions and how these interact with the market and would be helpful in appropriately targeting future policy proposals.

- *How can water market information be made more timely, reliable and accessible in a cost-effective way?*

There needs to be significant investment in providing a common platform that provides real time information on water trades. Ideally, an individual water right holder looking to buy or sell water should be able to go to a single location and find recent trade records to indicate water prices for their particular water product, in their given location.

While there are multiple platforms managed by private brokers, the multiple sources of information are a real barrier to potential water buyers and sellers, particularly small traders who are buying and selling water as part of their main business (such as irrigators), and who will have extremely limited time to commit to this task.

Environmental management

- *What are the guiding principles for 'best practice' management of environmental water? Are the institutional and governance arrangements for held environmental water working well?*

The "best" approach for providing and managing environmental water depends heavily on the vision and objectives for the river, the level and cause of hydrological alteration, and the current policy settings in the resource. The figure below provides an overview of how alternative strategies for environmental water link together depending on the system context (Horne et al., 2017b).

It is important to highlight that there are broadly 5 different mechanisms to allocate environmental water (Horne et al., 2017a). These allocation mechanisms have different levels of flexibility and legal security. The choice of allocation mechanism is important. This will be particularly relevant in systems that are not yet over-allocated and there is an opportunity to design an allocation system that works for the particular river (rather than retrofitting the concept of environmental water).

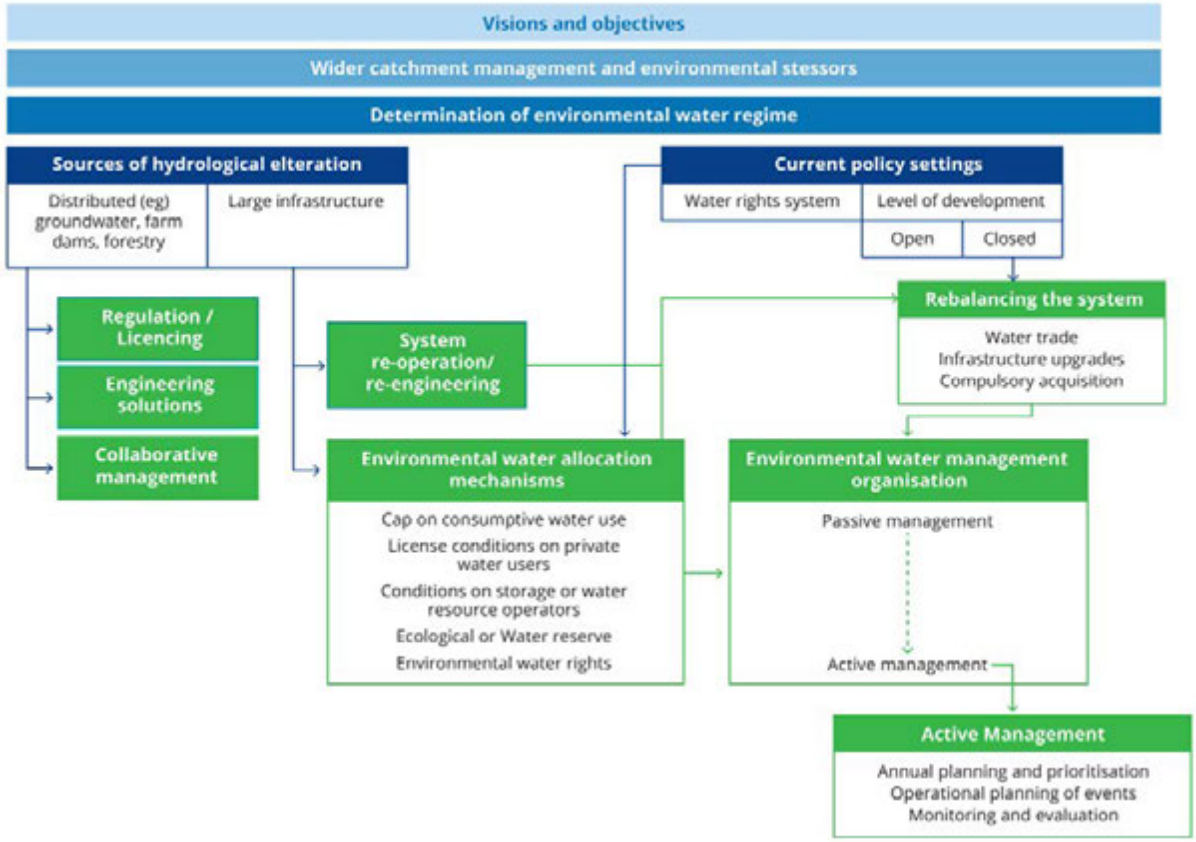

Figure- Environmental water management within water resource planning (Horne et al., 2017b).

A crucial aspect of actively managing held environmental water is that decisions are required on an ongoing basis (i.e. There is a very clear inner and outer loop of the adaptive management cycle) (Horne et al., accepted). Usually, decisions on where and when to use environmental water call on the accumulated experience of managers – so called 'experience based practice' (Cook et al., 2010) or expert panel processes. Managers analyse complex scenarios with spatial and temporal dimensions. There is currently a dearth of tools to aid and support these active decision making processes (Horne et al., in review). While the concept of adaptive management is clearly supported and espoused, the implementation of adaptive management of held environmental water remains a challenge. Managers and monitoring providers in CEWO's Long-Term Intervention Monitoring Project are meeting in late April to discuss adaptive management decision making in that program with the aim of identifying useful approaches to adaptive management and disseminating this knowledge among LTIM projects.

- *What is the role for governments in promoting trade in environmental water, and acquiring environmental water at least cost to the community?*

- *How can institutional arrangements be used to ensure agencies with natural resource management responsibilities (including environmental water managers) pursue least-cost approaches to achieving environmental and other public benefit objectives?*

This response considers both of the above dot points. We would caution against a focus on the concept or terminology of "least-cost". The OECD Water Governance initiative has developed a specific set of governance principles and indicators to address a number of governance deficits and gaps for complex water planning, allocation and management tasks (OECD, 2015). These can be summarised as: effectiveness, efficiency and legitimacy.

The focus of our current reporting on environmental water, and indeed the framing of this question, is on effectiveness and efficiency. The concept of legitimacy is critical for 'public confidence and ensuring inclusiveness of stakeholders through democratic legitimacy and fairness for society at large' (OECD, 2015). Lack of legitimacy (lack of trust in and identification with governing procedures and their outcomes) is one of the common reasons environmental policies fall short. The need for a "licence to operate" is a phrase that is commonly raised in relation to management of held environmental water (Docker and Johnson, 2017). This requires time and effort to invest in building legitimacy.

The value of environmental improvements and the social benefits or impacts that may come with this are not easy to quantify in monetary terms. By focusing on least-cost, we run the risk of missing opportunities to achieve considerable environmental and social benefit; environmental water that achieves this may not be the cheapest.

One of the important lessons of using water markets to achieve environmental outcomes has been that it is impossible to simultaneously maximise efficiency, efficacy and legitimacy. Under-investment in legitimacy will ultimately lead to compromised efficiency and efficacy of environmental water management; conversely, investing in legitimacy costs time and money, which reduces efficiency and efficacy (Garrick and O'Donnell, 2016). However, successful environmental water management depends on all three, and cutting any one of these will undermine overall success.

We argue that legitimacy needs to be embedded as a core criteria for measuring success of environmental water management. O'Donnell and Garrick (2017) have developed a multi-criteria approach to guide investment and measurement of success. Three of these criteria emphasize the broad policy goals of environmental water programs: efficacy, efficiency and legitimacy. The next three criteria reflect the essential implementation conditions: legal and administrative frameworks, organizational capacity and partnerships. Together, these policy goals and practical conditions define the features of successful environmental water programs, and provide an essential tool for guiding investment and evaluation of these programs around the world.

- *Are the policies that affect the health of water systems sufficiently integrated?*

It is difficult to consider the concept of multiple stressors in the current policy settings. Most environmental flows studies focus on the management actions that are possible from the perspective of an environmental water manager (i.e. they often do not include flow components that would be valuable if they cannot actually be delivered). Catchment impacts and the role of water quality in combination with flow magnitude is poorly incorporated in the current policies (in part due to the multiple jurisdictions involved and the challenges this creates in coordinating policy responses). Ideally, consumptive water use, environmental water use, and catchment management and restoration would be coordinated to achieve true integrated catchment and water resource management (ICWRM).

Urban Water Services

- *What policy and institutional arrangements are needed in the urban water sector to improve the efficiency of service provision?*

One of the biggest challenges confronting water management frameworks in the urban context is to adequately account for all sources and sinks of water in the urban catchment. There is an increasing need to consider cities as water catchments, which requires consideration of new water sources (such as rainwater, stormwater, desalination, recycled water, acquifer recharge) and effective water management, by reducing stormwater run-off, and managing water quality impacts. At present, water allocation and accounting frameworks do not adequately include all sources of water, which can undermine water accounts.

There is increasing interest in total water cycle management, and in combination with the increasing frequency of water shortages under climate change, there is increasing demand for efficient water use from a variety of different sources. Water allocation frameworks need to be able to account for all water present in the water cycle, to ensure that water is allocated and used in a transparent, equitable, and efficient way.

- *How can the level of competition in the provision of urban water services be increased?*

We question the premise of this particular question. The goal is to create urban water services that are efficient, low-cost and extremely reliable, and competition is only one way to achieve this broader goal.

Competition is often used as a shorthand for achieving lower cost of service provision, and lowering the barriers to entry for new service providers. By considering these issues separately, it is easier to target policy reform.

Firstly, achieving low cost, efficient urban services does not necessarily require competition. When it comes to essential services, increased competition without adequate regulation can lead to trade-offs in reliability. The lessons of the energy market, particularly over the past 12 months, indicate that competition needs to be coupled with ongoing government involvement.

We argue that, instead, continued investment in bodies such as Victoria's Essential Services Commission, so that they can continue to interrogate water pricing proposals from urban water authorities, will deliver the appropriate combination of low prices and high reliability of water service provision.

Secondly, lowering barriers to entry for third party or private enterprise to provide urban water services is a real opportunity to develop innovative solutions to the problems of service provision. This is especially the case in stormwater management, grey water and sewage treatment, where there is ongoing interest from the private sector.

However, any attempt to increase private investment in urban water service provision would require significant water law and policy reform. At the state level, particular legal reforms may be required to support the role of private enterprise in water services. More specifically, the states have developed a range of policies to encourage urban households and urban councils to use different sources of water (such as rainwater, stormwater and grey water) to improve water use efficiencies. Any attempt to support third party service provision would need to include a coordination of these different policies, so that existing incentives for rainwater tanks and grey water re-use, for example, doesn't undermine investment in new water products.

Achieving reform

- *Should further water reform be pursued through an improved NWI?*

The NWI is now 13 years old and was largely developed with a focus on over-allocated water resource systems (particularly the MDB). We believe that a review of the NWI is warranted, considering concepts of baseline requirements but also "best practise". This would need to be considered both the context of over-allocated resources, but also, with the focus on potential development in northern Australia, consideration of what best practice looks like for systems that are either not allocated or little allocated.

We believe it would be beneficial to structure an "improved NWI" around a framework that defines key components of sustainable resource management and how they link together. An initial "working" concept for this is presented below (Hart et al., in preparation).

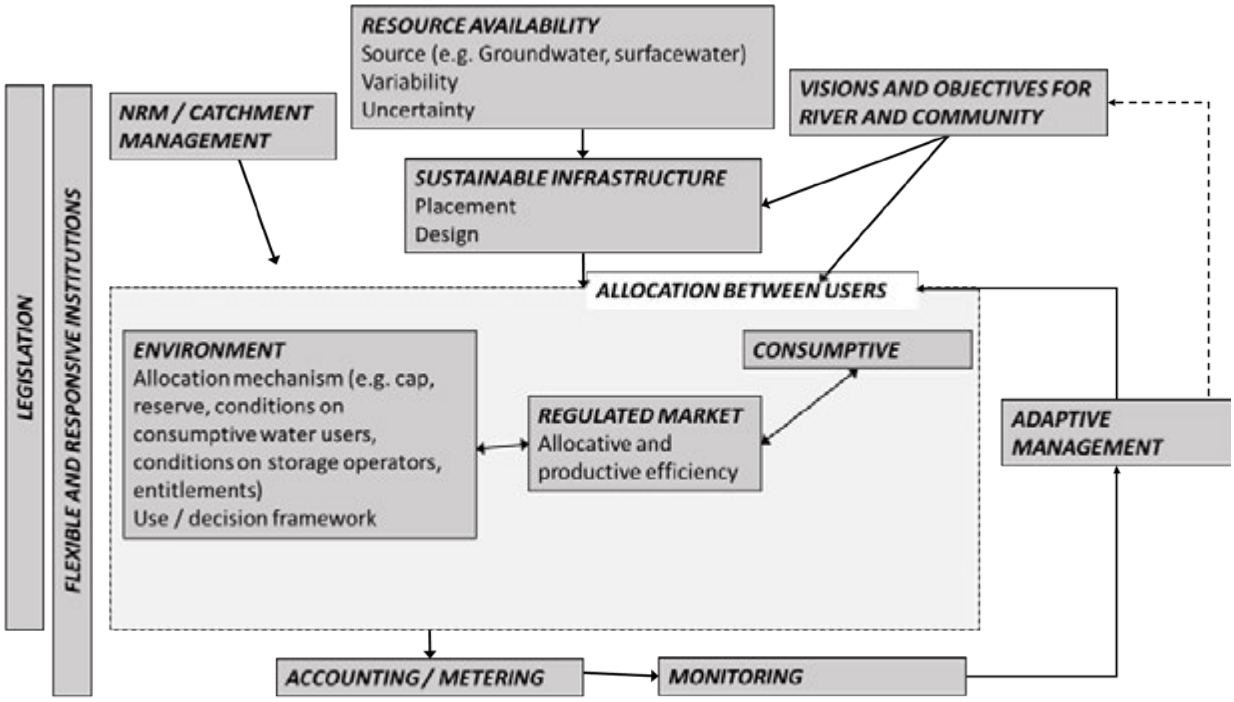

Figure – Possible broader framework to underpin future water planning (Source: Hart et al, in prep)

More generally, we believe that as climates, environmental understanding, agricultural practices, and market forces continue to change, then water reform should be considered as an ongoing process with no specific endpoint in mind. Under this model, regular reviews of the NWI are necessary, but not with a view to discontinuing the process.

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