Effectiveness of Victoria's water markets

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DGCONSULTING

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Executive summary

Water for Victoria commits to reviewing water market performance through **Action 9.3** *Improve the effectiveness of water markets*. Under this action, the Victorian Government Department of Environment, Land, Water and Planning (DELWP) has engaged Aither and DG Consulting to assess how well water markets are operating.

Water for Victoria (Figure 9.5) provided a preliminary assessment of the development of water markets in Victoria. The water markets assessed were the:

- Northern regulated surface water market
- Southern regulated surface water market (excluding south-central market)[1]
- Western regulated surface water market
- Unregulated surface water markets
- Groundwater markets.

This project follows that preliminary assessment. The findings and recommendations are intended to inform development of actions or work programs to improve water markets across the state, including south-central market development (Action 9.5 in *Water for Victoria*).

Key messages:

- Overall, water markets are contributing to the desired outcome in *Water for Victoria* of *markets provid[ing] an equitable and efficient way to allow access and sharing of finite water resources*.
- The report identifies a number of **priority areas for improvement** which strongly align with a range of actions outlined in *Water for Victoria*. Implementing these improvements will help make the most of the Victorian water grid and ensure Victoria is well placed to deal with the challenges of climate change and increasing water demand.
- The assessment framework and approach to periodic assessments can fulfil an important role in the ongoing monitoring of water markets into the future. Such ongoing assessments will help ensure continued confidence in Victorian water markets and assist in ensuring that government's prioritisation of market development and reporting effort is aligned with user needs and the broader interests of the Victorian community.

How is water market effectiveness assessed?

Water for Victoria (Figure 9.3) outlines the general elements of an effective market. This was used as a starting point for developing a detailed and repeatable assessment framework to enable objective assessment of the five Victorian water markets. The scope of assessment focuses primarily on water resource rights rather than supporting delivery, use and pricing frameworks, however effective trade of water resource rights requires clarity in these supporting frameworks and broad areas for improvement have been included.

[1] Note while the south-central market has not been rated in this report, information on its indicative performance and possible areas for improvement has been included (and will help inform Action 9.5 in *Water for Victoria*). Each market geography is defined in the body of the report.

The framework defines criteria and objectives, which if satisfied, would constitute an effective water market and contribute to the desired outcome for water markets outlined in *Water for Victoria* of *markets provid[ing] an equitable and efficient way to allow access and sharing of finite water resources*.

The assessment undertaken and reported here, was a broad and strategic one, which should provide a baseline for future reporting of market effectiveness. Tested with DELWP and a range of stakeholders, the assessment framework consists of:

1. **Objectives for water markets:**

- Objective 1: *Water markets contribute to the **efficient distribution** of water (through the market) across social, cultural, economic and environmental uses.*
- Objective 2: *Water markets **operate efficiently**.*
- Objective 3: ***Third party impacts** of water trading are managed appropriately.*
- Objective 4: *Participants have **open** and **non-discriminatory** access to water markets.*
- Objective 5: *Participants have **confidence** in market rules, regulations and institutions and can make informed decisions.*

2. **Criteria:** Ten assessment criteria inform progress against the five water market objectives, (these criteria are listed in full in the Table below). These criteria built on elements of an effective market outlined in *Water for Victoria* (Figure 9.3) and were refined through stakeholder engagement.

3. **Indicators:** Several indicators were identified for each criterion. These specify the state or level of performance that would contribute to a criterion being met.

4. **Pre-conditions for trade:** To recognise the differing states of development and demand for water markets across Victoria, contextual factors were considered through an assessment of *pre-conditions for demand for trade*.

Each market area was rated against each criterion, the **ratings system** is described under Table ES1 below.

Assessment results and implications

Summary of assessment results and areas for improvement

Markets are working effectively in the **northern regulated surface water market** area with fundamental market architecture and ongoing functional requirements in place.

A high level of trade indicates significant benefits from water being distributed more efficiently across space and time. Improvements in northern Victoria will thus need to focus on how growing demand and sophistication in the market is best managed. This includes ensuring that optimal trade rules, processes and governance arrangements are in place, that deliverability constraints are well managed, that market participants are well informed, and that the potential for anti-competitive behaviour is monitored and managed appropriately.

For the **unregulated surface water** and **groundwater markets**, performance appears consistent with the level of development of the market. Strengthening the fundamental architectural requirements of these water markets, and improving operation and understanding at the local level appear as the main areas for possible improvement. It was also observed that there may be lower demand for trade

in **unregulated surface water,** while there may be more prospects for increased trade in **groundwater markets** (based on the assessment of pre-conditions for trade).

The irrigation dominated systems in the **southern regulated surface water market** (Macalister, Bacchus Marsh and Werribee) operate at a similar level to northern Victoria. There is likely to be untapped trade potential associated with developing the urban market in the south-central area and greater integration of markets across the Victorian water grid. Developing the **south-central market** will require a significant design and development process, but there may be potentially significant benefits in pursuing this, as well as a number of simple refinements that will help enable trade in the short and medium term.

There is also potential for improvements to be made in the **western regulated surface water market** in order to improve effectiveness. While there are fewer users than other markets and some unallocated water, the variability of supply and diverse users and increasing scarcity due to climate change suggests there may be benefits in better facilitating trade. However, it should be noted that any changes should be informed by a clear assessment of demand for trade, and actions should only be pursued where cost-effective.

An assessment summary table is provided on the following page (see Table ES1) that gives a rating against each criterion. A summary of how markets are contributing to the overarching objectives has been provided at the bottom of the Executive Summary. Generally, the results of this assessment of effectiveness correlate well with the preliminary assessment of market development presented in Figure 9.5 from *Water for Victoria*.

Implications for future assessments

This report provides a framework for ongoing assessment of the effectiveness of water markets. It is recommended that follow up assessments occur every three to five years. It is expected that the overall framework based around objectives and criteria will remain robust over time. The framework could also be applied in more detail for more specific submarkets across the state and could be usefully applied across the connected southern Murray Darling Basin.

As an initial assessment, this report identified a series of data and reporting gaps that should be addressed. Assessing the effectiveness of water markets for the first time provided a new, user-oriented lens to a range of elements of Victorian water policy and management. As a result, undertaking this assessment has identified areas where current information about water policy and management could be more effectively communicated and summarised to meet the needs of water users and market participants. The potential for more user input (e.g. through surveys) was also identified as a possible means for tracking market performance more directly based on user satisfaction and confidence. As a result of these future opportunities, the means by which the criteria and objectives are assessed (currently a series of indicators) could be enhanced over time.

Table ES1 Summary of market area performance against criteria

Criteria		Northern	Southern	Western	Unregulated	Groundwater
Fundamental market architecture	a) Clearly defined cap(s) on the available resource	**High**	**High**	**Medium**	**Medium**	**Limited**
	b) Property rights have clear characteristics, are legally secure, readily tradeable, and have appropriate supporting frameworks	**High**	**High**	**Limited**	**Medium**	**Medium**
	c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)	**Medium**	**Medium**	**Limited**	**Medium**	**Medium**
	d) Robust and functioning water trade register	**High**	**High**	**Medium**	**Medium**	**Limited**
	e) Cost-effective and risk-based monitoring and enforcement for water resource rights	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)
	f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts	**High**	**High**	**Limited**	**Medium**	**Limited**
Ongoing function	g) Transactions are cost-effective and timely (including transactions with government and intermediaries)	**High**	**High**	**Limited**	**Medium**	**Limited**
	h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)	**Medium**	**High**	Not (yet) assessable	**Medium**	**Medium**
	i) Timely, accurate and readily accessible market information	**Medium**	**Medium**	**Limited**	**Medium**	**Limited**
Out-come	j) Water is efficiently distributed through the market across space and time	**High**	**Medium**	**Limited**	**Medium**	**Medium**

Effectiveness rating system:

High - *satisfies most indicators to a high level*: In aggregate, the market is performing effectively against the criterion – noting that there may still be a need for further development and improvement in discrete areas, or to match growing demand and sophistication of the market

Medium - *satisfies around half of the indicators to a high level, or most indicators to a reasonable level*: The market may be considered as somewhat effective, however there are some significant gaps and/or areas for improvement that could be considered.

Limited - *only satisfies a few indicators, or only satisfies several indicators to a very limited level*: The effectiveness of the market against the criterion is limited at present and change would be required to make the market effective – noting that this may not mean reform is warranted (particularly if there is low demand for trade / development).

Summary of performance against objectives

Water markets are generally contributing to the desired outcome of 'equitable access to and efficient sharing of water resources', with ongoing improvements and refinements required. Further improvements will help support *Water for Victoria's* more general objectives to support a healthy environment, a prosperous economy, and thriving communities, now and into the future.

Objective 1 – Water markets contribute to the efficient distribution of water (through the market) across social, cultural, economic and environmental uses: This objective is likely to be met when the other objectives below are also satisfied. In the northern regulated surface water systems, trade is common due to well defined systems, rules and process. This allows efficient distribution (through trade) of water across different uses. More could be done to facilitate this in other markets where more complex or less well defined (or understood) arrangements exist. Across markets, improved information on and for Traditional Owner (and other potential new market participants) participation in the market is needed to better recognise cultural and social values.

Objective 2 – Water markets operate efficiently: Markets in northern and southern regulated surface water systems operate relatively efficiently with low transactions costs. This is helped significantly by the Victorian Water Register. Outside of these markets, the unregulated, groundwater and western markets could operate more efficiently. The nature of entitlements and systems in these markets results in higher transactions costs and less clarity around, and understanding of, trade processes. Improving market information and addressing concerns about, and confidence in, water market intermediaries (where they operate) may help all markets operate more efficiently.

Objective 3 – Third party impacts of water trading are managed appropriately: In the northern market, trade rules based on hydrologic or third party rationale are in place but have remained relatively unchanged over time despite growth in trade (including interstate) and other changes. Trade rules in the southern market are performing similarly to the north. In the other markets, measures to manage third party impacts are embedded in trade rules and other provisions, however performance is less clear (and may be untested due to relatively low levels of trade). Managing third party impacts is critical and further investment in understanding potential third party impacts of trade, assessing the benefits and costs of management, and application of appropriate rules is vital for market development.

Objective 4 – Participants have open and non-discriminatory access to water markets: Significant reforms have been implemented in the northern regulated system to provide open and non-discriminatory access. These reforms or principles generally apply in other markets however there are limitations in place in some areas that inherently reduce the types of participants – e.g. there are requirements for groundwater and unregulated surface water licence holders to also own land given the nature of the take and use licence they hold.[2] There are trade-offs between providing non-discriminatory access and managing third party impacts which need to be considered in detailed assessment of market reforms in each area.

Objectives 5 – Participants have confidence in market rules, regulations and institutions and can make informed decisions: The best measure of confidence would be through participant surveys; however, this was not in scope for this review, and thus it is hard to make definitive judgements. However, anecdotal evidence, and views from the stakeholder workshops undertaken for this project underscored the importance of market confidence. Higher levels of stakeholder confidence may result where there are improvements in compliance, intermediary services, market information and management of anti-competitive behaviour.

[2] Note: There are a range of issues to consider in determining whether further reform is warranted is this regard.

1. Introduction

Context

Water for Victoria outlines the Victorian Government's approach to the strategic oversight of open and efficient water markets. This project specifically relates to the commitment by the government to the continuous improvement of water markets. The context for this project from *Water for Victoria* is outlined in the box below.

***Water for Victoria* context**

Markets provide an equitable and efficient way to allow access and sharing of finite water resources. Government defines the appropriate regulations and rules for the design and operation of water markets so they function effectively, ensuring that all participants and the broader community have confidence in them.

Water for Victoria (Figure 9.3) shows the government's approach to water market design and operation. The government balances oversight and consistency with an ability to design each water market to be fit-for-purpose, based on the context and characteristics of water resources and market participants.

The government establishes market arrangements to apply to all participants who seek to buy and sell water. These participants may include individual entitlement holders, market brokers and intermediaries, and organisational entitlement holders, such as water corporations, environmental water entitlement holders and private organisations.

Victorian water markets have evolved over time; performance has improved based on experience. More recently, we have seen more transactions within markets, and faster changes in the distribution of water use and mix of market participants. The government will make sure that arrangements and regulations continue to support effective markets.

The government will expand current water markets reporting to include a review of how well markets are operating. The areas for improvement and refinement recommended by the water markets review will direct the work program for the Department of Environment, Land, Water and Planning (DELWP) across the state and within specific water markets. The review will provide an ongoing means to examine appropriate regulation of market participants, including brokers and other market intermediaries, and also ensure there is no market distortion via participants misusing market power.

Action 9.3 – Improve the effectiveness of water markets

The Department of Environment, Land, Water and Planning will actively monitor water markets so they continue to operate effectively. The Department of Environment, Land, Water and Planning will expand current water markets reporting (beginning in 2017) to include a review of how well they are operating against the elements of an effective water market set out in Figure 9.3. The steps for the review are to:

- define the scope, information requirements, and indicators for recommendations to improve market effectiveness
- complete and share results and recommendations to inform:
  - the need for refinement of market regulations, rules or mechanisms
  - information for market participants and the public

- incorporate recommendations into the relevant work program(s) for action across the state and within specific water markets as needed.

Figure 9.3 from *Water for Victoria*



It is within this context and under Action 9.3 that DELWP has engaged Aither and DG Consulting to assess how existing water markets are operating.

Scope and objectives

The scope of this project was to: *(1) define the scope of effective water markets, (2) define the information requirements and indicators of effective water markets, (3) assess the current effectiveness of each water market, and (4) recommend refinements to improve the effectiveness of each market*.

It is intended that the assessment framework developed here be applied to future assessments of market effectiveness. This will provide a consistent basis for ongoing monitoring of water markets.

The same market aggregations used in the preliminary assessment in *Water for Victoria* (Figure 9.5.) have been used for this assessment:

1. Northern regulated surface water market
2. Southern regulated surface water market (excluding south-central market – see section 3.2.1 for further explanation)
3. Western regulated surface water market
4. Unregulated surface water markets
5. Groundwater markets.

The findings and recommendations from this assessment are intended to inform development of actions or work programs to improve water markets across the state, including south-central market development (Action 9.5 in *Water for Victoria*).[3] See Figure 1 for map of market areas below. Markets have been assessed as standalone, however future reform could allow greater integration of markets.

The scope of the project did not include detailed development of solutions to specific issues or detailed work programs. Instead, the assessment provides more general guidance on areas where

[3] Note while the south-central market has not been rated in this report, information on its indicative performance and possible areas for improvement has been included (and will help inform Action 9.5 in *Water for Victoria*).

improvements may be beneficial. By determining the likely extent to which there is demand for trade, the assessment also points to where potential gains may be most likely from improvements. However further detailed work is required to scope solutions and confirm priorities.

The assessment has been based on publicly available information, information provided by DELWP, and stakeholder engagement through a series of workshops with water resource managers and market operators, as well as market participants. Surveys, economic modelling and other detailed analysis was not within scope for this assessment, but could be used to inform future assessments.

The assessment focuses primarily on water resource rights rather than supporting delivery, use and pricing frameworks, however effective trade of water resource rights requires clarity in these supporting frameworks and broad areas for improvement have been included.

What is water market effectiveness?

Based on the purpose and intent of water markets described in *Water for Victoria* (see context section above) the desired outcome for water markets was defined as 'equitable access to and efficient sharing of water resources'.

To achieve this outcome, water markets must satisfy a number of objectives (see below). By measuring the extent to which objectives are being met, it is possible to assess the *effectiveness* of water markets.

As a result, this review considers effectiveness as the extent to which clearly defined objectives of water markets are being met. These objectives are based on established principles of economics and public policy which have been reflected in, and operationalised through, the *National Water Initiative*, and in Victoria through the *Water Act 1989,* and *Our Water Our Future* (2004) and now *Water for Victoria*. The resulting water market objectives have been refined through consultation.

Five water market objectives:

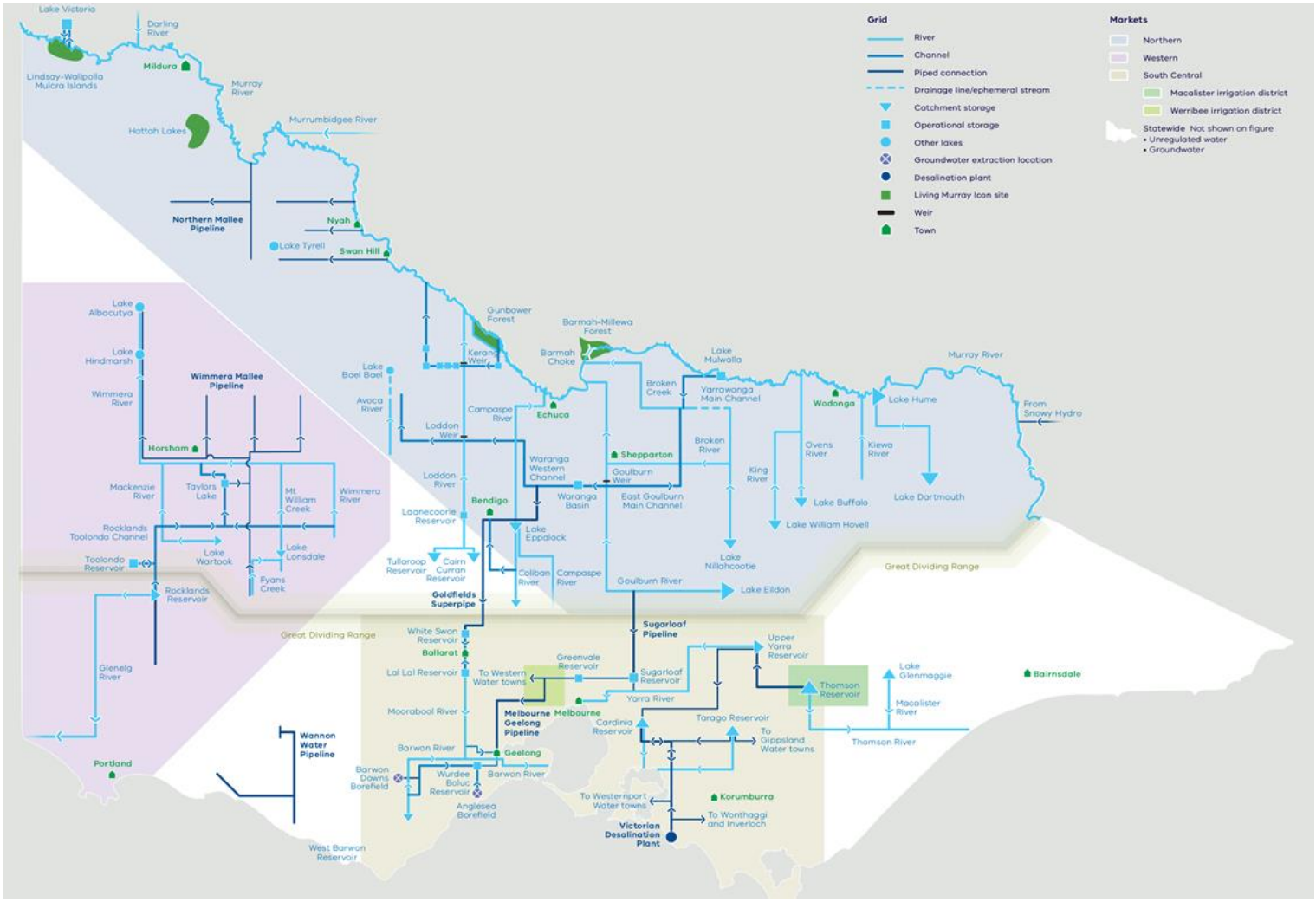
1. Water markets contribute to the **efficient distribution** of water (through the market) across social, cultural, economic and environmental uses.
2. Water markets **operate efficiently**.
3. **Third party impacts** of water trading are managed appropriately.
4. Participants have **open** and **non-discriminatory** access to water markets.
5. Participants have **confidence** in market rules, regulations and institutions and can make informed decisions.

An expanded definition of these objectives is provided at Appendix A.

Guide to this report

This report includes the results of the first review of water market effectiveness. It is divided into four sections:

- **Introduction** (this section): introduces the project context, scope and objectives
- **Assessment approach**: summarises the assessment approach for this review
- **Market assessments**: covers each of the five market areas and opportunities for improvement
- **Lessons and ongoing reporting**: lessons and recommendations for ongoing reporting.



Source: *Water for Victoria* p. 142

Note: Map of Victorian regulated surface water markets only (unregulated and groundwater markets cover the entire state and are not shown). This map combines the southern and south-central markets.

Figure 1 Map of Victorian water markets

2. Assessment approach

This section outlines the approach and structure of the assessment, and provides a user guide for interpreting the assessments made in Section 3.

2.1. Approach to assessment

The approach to the assessment can be broken into four components as labelled in Figure 2, and described below.

1. **Objectives:** As noted in the preceding section, effectiveness of water markets is the extent to which water market *objectives* are being met. To assess effectiveness, it is necessary to develop a framework that measures performance against these five defined water market objectives (Section 1). An overarching review of how water markets are meeting these objectives as provided in the Executive Summary, based on the linkages in Appendix B.

2. **Criteria:** To do this, assessment *criteria* that help inform progress against the five water market objectives were developed (these criteria are listed in full in the Figure below). Ten criteria were developed to assess market effectiveness. These criteria build on the elements of an effective market outlined in *Water for Victoria* and were refined through stakeholder engagement. They provide broad coverage across the critical components of a water market and have been grouped by type. Written assessments and ratings have been made for each market against the ten criteria listed.

3. **Indicators:** A number of *indicators* were identified for each criterion. These indicators specify the state or level of performance that would contribute to a criterion being met (i.e. they provide the information upon which to make the judgement about whether, and to what extent, the criteria is met). The indicators sit behind the assessments of market effectiveness made in this report, but have not been presented as they are exceptionally detailed and not required to communicate the results of the assessment.

4. **Pre-conditions for trade:** Additionally, to recognise the differing states of development and demand for water markets across Victoria, contextual factors were considered through *pre-conditions for demand for trade*. The extent to which the pre-conditions are present provides an indication of the likely demand for trade. If none of the pre-conditions were present, then improvements to water market settings are unlikely to be beneficial. Conversely, if the preconditions for trade are present, then water market reforms are likely to be beneficial.

   The pre-conditions for demand for trade are:

   Scarcity – Water systems need to be at or near full allocation. If water users are able to obtain more water through other means (e.g. issuing of new licences from government) then there is little incentive to trade.

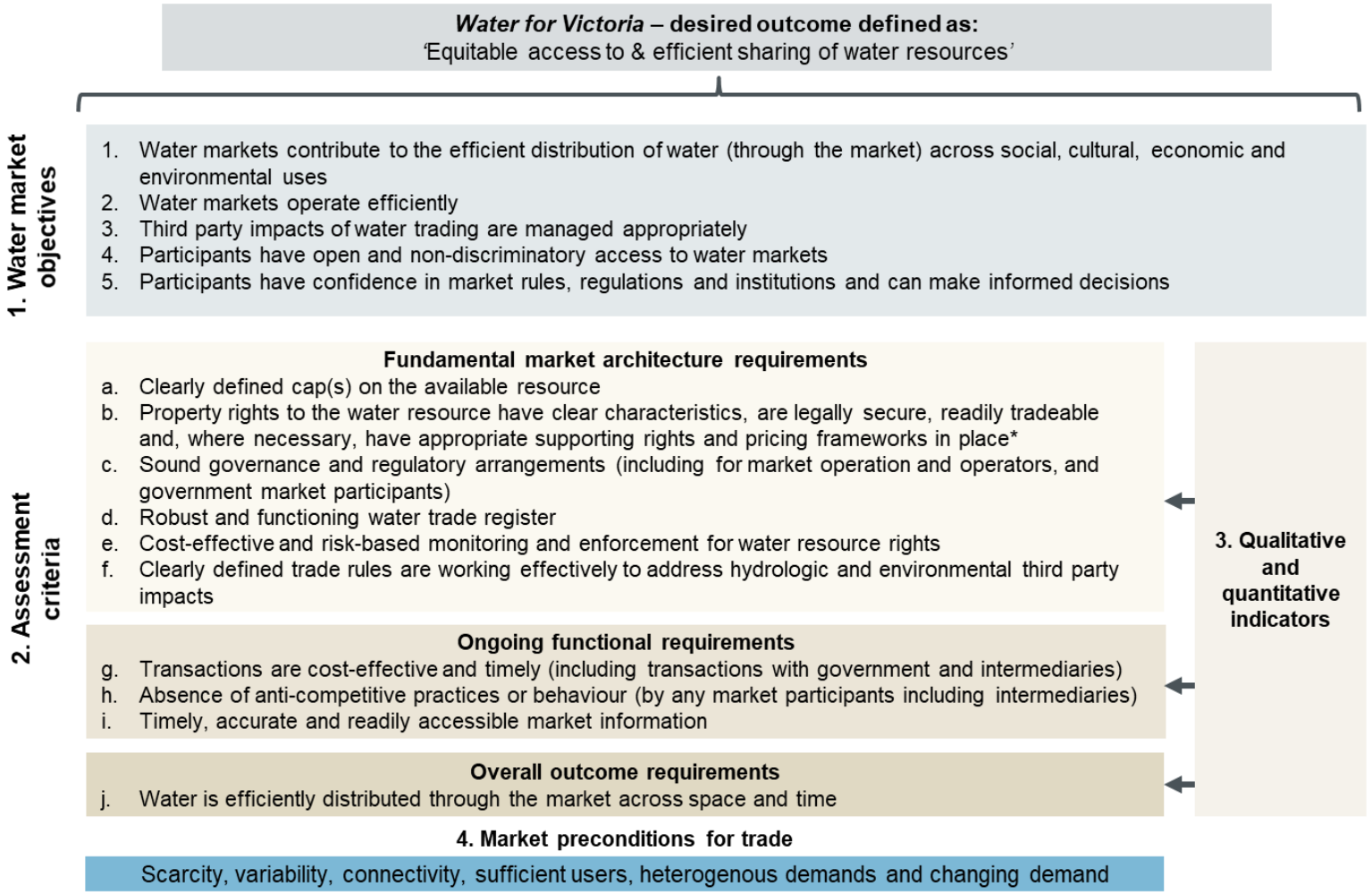
   Variability – Variation in water availability within and between water years (seasons), as well as across different geographic areas, or over time, will contribute to the need for water users to trade with others (particularly when combined with heterogeneous demands – see below).

   Connectivity – Water systems that are connected to others increase the number of water users that can trade with one another, and can leverage increased differences in both water availability and demand, leading to greater opportunities for trade.

Sufficient users – As with many markets, greater numbers of users can contribute to increased parties to trade with, liquidity, greater variation in demand, and therefore greater opportunities to trade.

Heterogeneous demands – Where the demands of all users are the same (homogenous) there may be less demand for trade, as users are likely to have similar water requirements. Different industry types existing in the same area (or connected areas) mean more opportunities to trade as demand profiles can vary.

Changing demand – Where there is change in industries, including in response to external drivers such as structural shifts in global commodity markets, there can be increased need to trade as different entities enter, exit, or modify activities.



Note: * See clarifying statement against this criterion at Table 2.

Figure 2 Water market effectiveness assessment framework

2.2. Defining the criteria and ratings system

2.2.1. Defining assessment criteria

Table 2 describes what we would expect to see for each individual criterion to be satisfied. It summarises the assessment indicators that support each criterion – that is, what conditions need to be met to satisfy a criterion. Because there are multiple indicators per criterion, it is necessary to provide a rating against each criterion.

Table 2 Assessment criteria requirements

Criteria	Summary of indicator requirements
a) Clearly defined cap(s) on the available resource	There is an existing volumetric cap; it is defined in statute and determined using a transparent and suitable method; there are review arrangements; information is available; it is monitored and reported against; and there is an existing system for allocating unallocated water (if relevant).
b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks in place.[4]	Water resource entitlements are secured under law; they have clear characteristics and conditions that are transparent; they are tradeable; the water resource access right is separated from land and other rights; they are supported by appropriate delivery, use and pricing frameworks.
c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)	Institutional roles and responsibilities for government market regulators, operators, managers and participants are clearly defined and effectively separated to minimise conflicts; there are appropriate provisions for government entities participating in the market; and other participants have confidence in governance and regulatory arrangements.
d) Robust and functioning water trade register	Effective register in place (with appropriate processes to monitor and improve such that it remains contemporary); and register information is accurate, timely and reliable.
e) Cost-effective and risk-based monitoring and enforcement for water resource rights	For water resource entitlements, an effective monitoring and enforcement regime is in place; and regime is cost-effective and timely.
f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts	Clear, transparent and accessible trade rules; rules are non-discriminatory (to market participation); there is continued adequacy of trade rules to protect against hydrologic and environmental third party impacts, including clear rule review processes; and there are a minimal number of rule challenges.

[4] The scope of this review was confined to markets in water resource rights (whether unbundled as water shares and the allocation made to them, or bundled as take and use licences or bulk entitlements). However, effective trade of water resource rights also requires clarity in supporting frameworks (e.g. delivery, use and pricing frameworks). Areas for improvement in supporting frameworks may be discussed under this criterion.

Criteria	Summary of indicator requirements
g) Transactions are cost-effective and timely (including transactions with government and intermediaries)	There is an efficient framework for undertaking trade; costs are appropriate; there is high performance of and confidence in third party intermediaries or similar service providers (where operating); and the time to process trades is minimal.
h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)	Effective frameworks are in place to manage anti-competitive behaviour by market participants, including intermediaries; there are a minimal number of issues/occurrences; there is a high level of participant knowledge and understanding of issues and frameworks; extent of concentration of ownership and take-up of trade opportunity is appropriate; and price responds predictably to supply and demand.
i) Timely, accurate and readily accessible market information	High availability of information on how to trade; price discovery; and high participant, commentator, water resource manager and operator satisfaction with available information.
j) Water is efficiently distributed through the market across space and time	Water is moving freely between buyers and sellers in different locations (subject to trade rules) and in response to key changes in supply and demand (including by irrigator, urban, industrial, environmental, social or cultural water users).

2.2.2. Assessing and rating markets against criterion

The rating system used to score against each criterion is shown in the table below.

Importantly, a **high** rating does not necessarily mean that there is no room for improvement, or that reforms could generate significant value. Conversely, an assessment of **limited** effectiveness does not necessarily mean that reform is warranted. In both cases, further consideration of the demand for trade is required (i.e. the extent to which the preconditions are present), and the cost effectiveness of any solutions. As mentioned above, this detailed prioritisation of actions based on costs and benefits is beyond the scope of this engagement.

Table 3 Effectiveness rating system

Rating	Description	Interpretation
High	Satisfies most indicators, to a high level	In aggregate, the market is performing effectively against the criterion – noting that there may still be a need for further development and improvement in discrete areas, or to match growing demand and sophistication of the market.
Medium	Satisfies around half of the indicators to high level, or most indicators to a reasonable level.	The market may be considered as somewhat effective, however there are some significant gaps and/or areas for improvement that could be considered.
Limited	Only satisfies a few indicators, or only satisfies several indicators to a very limited level.	The effectiveness of the market against the criterion is limited at present and change would be required to make the market effective – noting that this may not mean reform is warranted (particularly if there is low demand for trade / development of the market).

3. Market assessments

This section contains the assessment for each of the five market segments. Each assessment contains a description of the market, market pre-conditions, a trade summary, assessment against criteria, and areas for improvement.

3.1. Northern regulated surface water market

3.1.1. Market characteristics

The northern regulated surface water market (or the northern market) covers an extensive geographic area, from Wodonga in the East, to the South Australian border, and is bordered by the River Murray in the north, to as far south as Lake Eildon and the headwaters of the Loddon River. It includes several major water systems, including the Loddon, Campaspe, Goulburn, Broken, and Ovens Rivers. It encompasses major irrigation areas including the Goulburn-Murray Irrigation District (GMID) and those managed by Lower Murray Water in the Sunraysia region. The Northern Mallee Pipeline and Coliban system are also connected to this market.

It is also connected to both New South Wales and South Australia and there are significant volumes of interstate trade.[5] The area was one of the first to be significantly developed for irrigation and one of the first to trial, and subsequently develop water markets. It is now the basis for a wide range of irrigation subsectors with a variety of crop types and water uses, and a range of high value output enterprises operating in the area. There are also large environmental holdings, significant urban demand and growing recognition of recreational and cultural demand. A summary of trade activity is provided below.

3.1.2. Trade summary

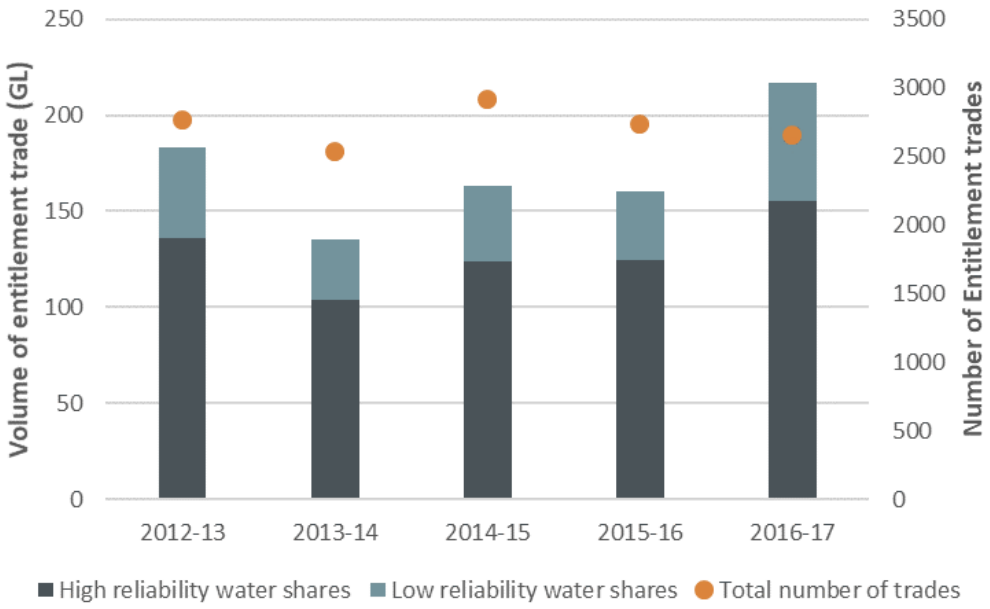
Entitlement and allocation trade is substantial in the northern regulated surface water market, indicating that water is being bought and sold (or reallocated through the market) to where it is of most value (for irrigation, urban or environmental water uses). Figure 3 shows the total volume of entitlement traded, with low reliability water shares, and high reliability shares as separate series, the total entitlement on issue across these shares is 3,179 gigalitres (GL) (2,380GL in high reliability and 799GL in low reliability).

Plotted against the right-side axis of Figure 3 is the total number of trades (across both low and high reliability water shares). In 2016-17 a total of 216GL of entitlement was traded through 2,657 trades. Volume traded as a proportion of total entitlement on issue (i.e. liquidity) for 2016-17 was 6.8 per cent.

Allocation trade volume varies year to year with significant numbers of trade (between 10,000 and 14,000 trades) completed each year (see Figure 4), and large volumes (up to 2,230GL in 2016-17) traded across the system.

Trade in the undeclared Northern Mallee and Coliban systems is not reported in the figures below.

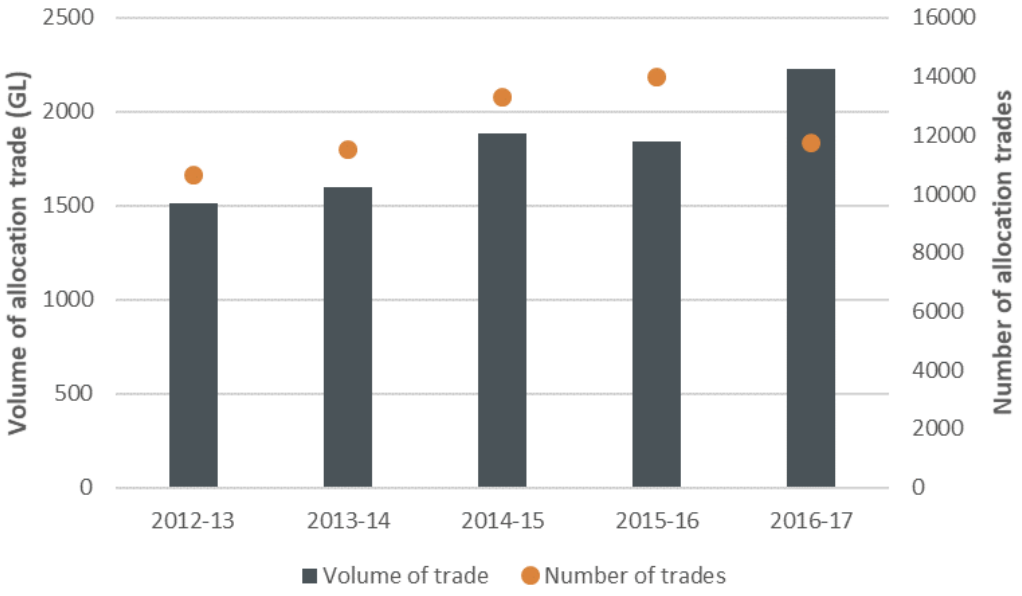
[5] Review of interstate trade arrangements and frameworks and processes in adjoining jurisdictions was not in scope for this review.



Source: Victorian water register data from October 2017.

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 3 Northern regulated surface water market entitlement trade volume and numbers



Source: Victorian water register data from October 2017.

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 4 Northern regulated surface water market allocation trade volume and numbers

3.1.3. Assessment of pre-conditions for trade

An assessment of the preconditions in this market area suggests there should be significant demand for trade – all of the preconditions are met, and to a significant extent. This is summarised in the table below.

Table 4 Pre-conditions for trade

Pre-condition	Description
Scarcity	Fully allocated
Variability in supply	High, spatially and temporally
Connectivity	High, within and interstate
Sufficient users	Yes, many users
Heterogeneous demand	Yes, highly
Changing demand	Yes, increasing
Relative demand for trade	**High**

3.1.4. Assessment of northern regulated surface water market

Below are the assessments made for each criterion for the northern regulated surface water market (refer to Table 3 for description of High, Medium and Limited).

a) Clearly defined cap(s) on the available resource

- **High** – The high rating is supported by: volumetric caps being set with reference to methods for determining sustainable levels of take and established monitoring and review arrangements; however, transparency and understanding could be improved.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks

High – Property rights in declared water systems are legally secure and tradeable.[6] Characteristics are generally clear, though transparency and information on reliability could be improved (including in the context of long term reliability). Supporting delivery and pricing frameworks have been developed and help to manage third party impacts, however in some cases these are not as well understood.

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)

- **Medium** – Responsibilities for governance and market operation are generally well assigned between rural water corporations, DELWP and the Northern Victorian Resource Manager, and descriptions of the roles of these organisations are available. However, market participants continue to raise some concerns about conflicts of interest (though the materiality of any issues is unknown and may be driven by information gaps). There is generally sound arrangements and

[6] Note some parts of the northern market remain undeclared e.g. the Coliban system.

disclosure for government agencies acting as market participants, with water trading strategies published.

Overall, basic requirements are met in most areas; however, market participant concerns need to be further considered and could potentially be overcome through better provision of information.

d) Robust and functioning water trade register

- **High** – The Victorian Water Register (the Register) is generally recognised as the leading and most comprehensive water register in place in the southern Murray Darling Basin. Overall, the Register is robust and functioning, however it is noted that there are some vulnerabilities (e.g. the recent outage to the Register webpage and online services) and the Register could still be improved.

e) Cost-effective and risk-based monitoring and enforcement for water resource rights

- **Medium** – Rural water corporations are generally responsible for monitoring and enforcement. It was beyond the scope of this assessment to determine the efficacy of the programs run by the different water corporations. However, other reviews such as the Murray-Darling Basin Water Compliance Review 2017 suggest that compliance against water shares and allocation is generally well monitored by rural water corporations. Overall, while it appears overuse is well covered through metering and monitoring, reporting could be improved, and enforcement arrangements could potentially be more transparent and strengthened, as identified in *Water for Victoria* action 8.5.

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts

- **High** – Limits on trade have previously existed that were not based on hydrologic or third party rationale but have since been removed. Information on trade rules is available but information on the rationale behind the rules could be improved, as could the understandability of trade rules in general. Trade rules have remained relatively unchanged over time despite growth in trade (including interstate), as well as changes to trading patterns and water use. Victoria is continuing to work with the Murray-Darling Basin Authority (MDBA) and other Basin states to ensure these arrangements are appropriate. This work is part of *Water for Victoria* Action 9.6.

g) Transactions are cost-effective and timely (including transactions with government and intermediaries)

High – Trade processing within Victoria is generally efficient, with standards for processing times met or exceeded (and reported against publicly). Fees are generally low and have fallen due to greater use of on-line processes. There may be room for improvement of interstate trade processing however this relies on interjurisdictional collaboration. The quality, efficiency and cost of third party intermediary services was not specifically assessed, but anecdotal information from stakeholder workshops suggests many market participants believe there are issues with intermediary services relating to conduct and practices, and competition (also see criteria (h)).

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)

- **Medium** – Broad national legislative frameworks exist for dealing with anti-competitive practices and Victoria also conducts a regular audit of intermediaries who use the Water Register online broker portal. New entrants have changed the distribution of ownership, but it is unclear if this is having any negative effects on competition at present. While there is no evidence to suggest any major examples of anti-competitive behaviour or practices, there are opportunities to collect more information to understand concerns; improve water market information (see also criteria (f) and (i)); improve use of the Victorian audit of intermediaries using the Water Register broker portal;

and, to work with other states and agencies to improve communication of existing regulations and to monitor complaints.

i) Timely, accurate and readily accessible market information

- **Medium** – There is generally sufficient information overall about the process and operation of water trade, but certain specific issues with market information do exist (in particular understanding and reconciling differences in reported prices). As the market matures, participants require better and more sophisticated information to make decisions, resulting in a medium rating against this criterion. There may also be a need to improve information to assist newer market participants (such as Traditional Owners and recreational water users) in accessing the market.

j) Water is efficiently distributed through the market across space and time

- **High** – Markets in northern Victoria have facilitated major adjustments in water use between different types and locations of water use in response to external factors such as drought, or changes in demand for different agricultural outputs, as well as the need to address overallocation. There may be a need to improve information about the relationship between movement of water use and structural adjustment, including assisting other policy makers to act effectively to facilitate structural adjustment in the relevant policy areas.

3.1.5. Assessment summary and areas for improvement

The northern market is the most well-developed market in Victoria and can be considered a successful example of an effective water market. The market has facilitated major changes in water use between different types and locations of water use in response to external factors such as drought, or changes in demand for agricultural output, as well as the need to address overallocation, thus supporting more efficient distribution of water resources over time.

While the market is well developed, increasing demand for trade and more advanced uses of the market are driving the need for more sophisticated water markets. As a result, many of the areas for improvement relate to improving existing processes to modernise the market. In summary some of the key opportunities include: addressing known deficiencies with market information; working to ensure communication of and confidence in broker and intermediary regulation (including working with other states and agencies on these issues); improving monitoring and reporting in relation to actual or perceived competition issues; and, ensuring that optimal trade rules, processes and governance arrangements are in place and well communicated; and that deliverability constraints are well managed.

3.2. Southern regulated surface water market

3.2.1. Market characteristics

The southern regulated surface water market consists of the Macalister system in the state's East, and the Werribee and Bacchus Marsh systems west of Melbourne. These systems include irrigation district water users and river diverters and have all been declared.

Action 9.5 in *Water for Victoria* proposes to develop the water market in south-central Victoria. This would include the aforementioned irrigation systems and the major urban supply areas for Melbourne (including the Yarra, Tarago, Silver-Wallaby creek, and Thomson systems), as well as regional areas proximate to Melbourne including in Gippsland, the Mornington Peninsula and Westernport, the

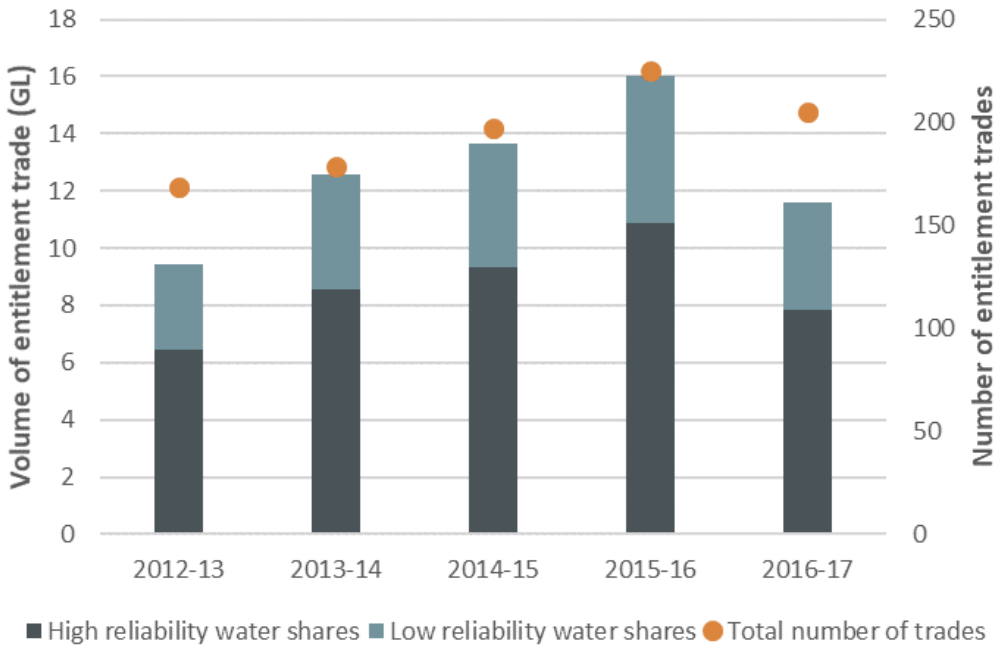
Ballarat and Werribee areas and the Geelong region. There are pipeline connections between many of these systems, and these are often used to transfer potable water.

The assessment below reviews water trade in the southern regulated surface water market (dominated by irrigation systems), as well as discussing aspects of the bulk entitlement framework used for urban supply (i.e. the 'south-central' market) that would be relevant for the government in implementing Action 9.5.

3.2.2. Trade summary

Within the southern irrigation systems, there are relatively low levels of trade of entitlement. The total entitlement on issue across the products and trade zones included in this analysis is 244GL (165 GL in high reliability water shares, and 79 in low reliability water shares). Figure 5 shows the total volume of entitlement traded, with low reliability water shares, and high reliability shares as separate series. Plotted against the right-side axis is the total number of trades (across both low and high reliability water shares). In 2016-17 a total of 11.6GL of entitlement was traded through 205 trades. Volume traded as a proportion of entitlement on issue (i.e. liquidity) for 2016-17 amounted to 4.8 per cent.

Allocation trade occurs within the southern irrigation systems; however, this is relatively small in volume and number of trades compared to northern declared systems. Allocation trade volume for 2015-16 was the highest for the past five-year period at 28.2GL, and the number of trades also peaked in 2015-16 at 811 trades (see Figure 6).



Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 5 Southern regulated surface water market entitlement trade volume and numbers



Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 6 Southern regulated surface water market allocation trade volume and numbers

3.2.3. Assessment of pre-conditions for trade

In summary there is likely to be moderate to high demand for trade across the southern regulated surface water market. This is summarised against the pre-conditions for trade in the table below.

Table 5 Pre-conditions for trade in southern market

Pre-condition	Description
Scarcity	Fully allocated systems
Variability in supply	High spatially and temporally
Connectivity	Discrete systems with fair connectivity to other networks
Sufficient users	Yes (though lots of small users in some systems)
Heterogeneous demand	Lower heterogeneity within systems
Changing demand	Yes – but unevenly
Relative demand for trade	**Moderate to high demand**

3.2.4. Assessment of southern regulated surface water market

Below are the assessments made for each criterion for the southern regulated surface water market (refer to Table 3 for description of ratings).

a) Clearly defined cap(s) on the available resource

- **High** – At the irrigation system level, caps are relatively clear and the fact that systems are fully allocated (and water can be accessed through trade) is communicated by Southern Rural Water, hence a high rating is appropriate.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks

- **High** – Entitlements in irrigation systems are clearly specified, legally secure and tradeable *water shares* that generally have the same level of sophistication and tradeability as those in the north.

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)

- **Medium** – Irrigation systems in the south are managed relatively well with assigned roles and responsibilities. However similar to the northern systems, there may be some opportunities to improve transparency and separation of processes and functions.

d) Robust and functioning water trade register

- **High** – The Victorian Water Register is generally recognised as the leading and most comprehensive water register in place and for irrigation systems the same findings as the northern market apply.

e) Cost-effective and risk-based monitoring and enforcement for water resource rights

- **Medium** – Based on assurances and comments provided by DELWP, compliance against water shares and allocations appears to be generally well monitored by rural water corporations, however transparency and reporting of this could be improved. The process for rectifying non-compliances could also be more transparent and strengthened (where cost-effective).

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts

- **High** – Trade rules are published for southern irrigation systems, but similar to northern systems, there could be greater transparency around the rationale and basis for the different rules that are in force.

g) Transactions are cost-effective and timely (including transactions with government and intermediaries)

- **High** – Processing of transactions in irrigation systems is similarly efficient as for northern markets.

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)

- **High** – Broad national frameworks and regulatory arrangements exist for dealing with anti-competitive practices. There is a lack of evidence to suggest competition or concentration of ownership issues exist in irrigation systems. However, knowledge of participants about trade and competition frameworks could be improved over time.

i) Timely, accurate and readily accessible market information

- **Medium** – There is potentially room to improve market understanding of participants and trade data (in particular understanding and reconciling differences in reported prices), although because these markets are thin such issues may always persist.

j) Water is efficiently distributed through the market across space and time

- **Medium** – Water moves between uses and users to some degree within the southern irrigation areas, noting that there is not significant heterogeneity in uses in these systems (movement is more likely between different users rather than types of uses or locations). Entitlement trade and unbundling has enabled enterprise change and development, and water has been able to move in and out of districts to the associated river systems. There are physical connections between irrigation and urban networks in the south, but market arrangements are not sufficiently developed to take advantage of this – capitalising on this opportunity could contribute to achieving more efficient allocation of water over space and time (refer section to 3.2.5). In some systems there are a number of smaller users that tend not to trade (or sell) water – despite demand from potential buyers, this ultimately limits trade.

3.2.5. Discussion of south-central water market development

Below is a discussion of considerations to inform south-central water market development against each criterion of market effectiveness. It focuses on the urban dominated systems in and around the Melbourne metropolitan region.

Pre-conditions for trade

In terms of south-central water market development, most of the pre-conditions are met, while others are not fully met. While scarcity may be increasing there is also some flexibility in the urban market (with other sources of water such as desalination). There are fewer large urban 'users' (i.e. potential market participants), however they serve millions of customers and there may be large efficiencies in facilitating trade between these parties. Demand is increasing with population growth, and will likely increase unevenly across different areas.

While connectivity using the water grid is high, it may not be readily available for end users to trade via. There are also policy and operational matters to resolve to take full advantage of grid connectivity for the purposes of trade.

Assessment criteria

a) Clearly defined cap(s) on the available resource: Water resources across the south-central market area are capped through bulk entitlements. Bulk entitlement frameworks for urban supply are more complex and could be more readily accessible and understandable, including providing greater clarity on how bulk entitlements held between different entities interact.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks: Urban and environmental bulk entitlements are legally secure however there is less understanding around characteristics, and trade is complex and administratively burdensome. Supporting frameworks to manage delivery rights and pricing implications would need to be developed to better enable trade between urban water corporations.

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants): Market governance and regulatory arrangements for trade in urban systems are yet to be developed in a substantive way and so at present there is a requirement for a high level of bespoke arrangements.

d) Robust and functioning water trade register: The functionality of the Register could be improved to better enable bulk water management and communicate bulk trade in more simple terms.

e) Cost-effective and risk-based monitoring and enforcement for water resource rights: DELWP monitors compliance of bulk entitlements. However, usage uploads to the register are often slow and there is a high degree of self-regulation by bulk entitlement holders.

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts: Clear trading rules for water available under bulk entitlements have not yet been established. Review processes for trade rules could also be made more explicit (and provide greater certainty to customers).

g) Transactions are cost-effective and timely (including transactions with government and intermediaries): At present, transaction costs for urban areas are high (largely due to uncertainty) making the process to transfer water available under bulk entitlements cumbersome for both government and market participants. The duration of approvals processes in the urban system is currently long, but enhancements should be fit for purpose and may not need to be as quick as those in irrigation systems.

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries): Ensuring anti-competitive practices will be a critical design consideration given the potential for competition issues associated with the limited number of likely participants.

i) Timely, accurate and readily accessible market information: At present information for urban areas is difficult to find and interpret, and hard to validate where it exists. More basic information such as types and processes of trading is also lacking.

j) Water is efficiently distributed through the market across space and time: Looking at the south-central market as a whole, there are physical connections between irrigation and urban networks in the south, but market arrangements are not sufficiently developed to take advantage of this – capitalising on this opportunity would contribute to achieving more efficient allocation of water over space and time.

3.2.6. Assessment summary and areas for improvement

The regulated irrigation systems within the southern market area operate at a similar level to the northern regulated surface water market with like settings in place, and can be considered as having the fundamental architecture in place for an effective market. Opportunities for improvements to the irrigation markets include: addressing known deficiencies with market information, and improving transparency around the rationale and basis for the different trade rules that are in force, and improving information on opportunities to trade.

Outside of irrigation systems managed by Southern Rural Water, bulk entitlement holders (both urban and environmental) have managed to trade, though trade to date has been limited. *Water for Victoria* recognises that many fundamental elements supporting the development of effective markets still need to be put in place.

Opportunities for south-central market development include scoping the potential for more substantial reforms, in line with *Water for Victoria* actions. Additionally, there may be more straightforward changes that could be more readily implemented including; improving information on how to trade under the current framework; clarifying interaction of trade and economic regulation; streamlining approvals processes; and providing improved information on bulk entitlements. It should be noted that improvements to the urban areas may help integration between the irrigation markets.

3.3. Western regulated surface water market

3.3.1. Market characteristics

The western regulated surface water market (or western market) for this assessment comprises the regulated Glenelg and Wimmera systems. It includes headworks in the Grampians and the Wimmera-Mallee pipeline. Some interaction with unregulated surface water and groundwater may occur where users have dual sources of supply.

The system supports a number of uses and users including rural, mining, urban, environmental and recreational water, supplied under bulk or environmental entitlements. Water may be traded between entitlement holders. Entitlement holders may also enter into 'supply by agreements' (SBAs) with individual customers. Supply by agreement arrangements may also be varied to account for transfers.

Following construction of the Wimmera-Mallee pipeline to replace inefficient channel systems, domestic and stock users are now supplied by the pipeline and additional water is available for growth, regional development and the environment. Because additional water is still available to supply pipeline customers under the Grampians Wimmera Mallee bulk entitlement, this assessment focuses mainly on trade between bulk and environmental entitlement holders, as well as supply arrangements for large SBA holders. This makes this assessment similar to considerations for south-central market development which is also dominated by bulk entitlement holders.

3.3.2. Trade summary

In 2015-16 there were four allocation trades totalling 3,598 ML in western Victoria (as reported in the Victorian Water Trading Annual Report for 2015-16).

3.3.3. Assessment of pre-conditions for trade

The overall demand for trade was considered as moderate. While there are few users and overall demand for water is hard to measure, there appears to be a number of pre-conditions that suggest some demand for trade would be present (see table below).

Table 6 Pre-conditions for trade

Pre-condition / market area	Description
Scarcity	Some additional 'growth' water is available; however, scarcity is likely to increase
Variability in supply	Yes, large variability between years
Connectivity	Some connectivity, however the system is complex which creates limitations
Sufficient users	Limited: few large users (note numerous small users in pipeline areas)
Heterogeneous demand	Industry, urban, recreational & cultural, but no significant irrigation sector at present
Changing demand	Unclear
Relative demand for trade	**Medium**

3.3.4. Assessment of western regulated surface water market

Below are the assessments made for each criterion for the western regulated surface water market (refer to Table 3 for description of High, Medium and Limited).

a) Clearly defined cap(s) on the available resource

- **Medium** – There is a cap under Basin Plan SDLs for north of the Great Dividing Range, and through a bulk entitlement framework that covers the north and south. Reporting against the cap is less clear, and greater transparency around review processes could also be improved.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks.

- **Limited** – Water available under bulk or environmental entitlements can be traded, however this is generally complex and difficult to undertake. This is partly driven by the varying characteristics of different entitlements and supply by agreements, and lack of trade rules and appropriate supporting frameworks (which necessitates case by case consideration for trades).

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)

- **Limited** – Under current settings, the rural water corporation has multiple roles and responsibilities including storage management, sale of unallocated water, market operation, trade approval and negotiation. While measures have been put in place by the rural water corporation to separate storage management roles from other market functions, these underlying settings have the effect of reducing clarity and transparency, and consequently, some workshop participants noted a lack of confidence in the governance and regulation of the market in this area. The materiality of this issue is unclear.

d) Robust and functioning water trade register

- **Medium** – Register functionality could be improved to better enable bulk water management and communicate bulk trade and supply by agreement arrangements in more simple terms. At present

bulk entitlement orders are published on the register, but simplified trade volumes or prices are not published and published information is difficult to interpret.

e) Cost-effective and risk-based monitoring and enforcement for water resource rights

- **Medium** – This is largely the domain of GWMW for supply by agreement holders, while DELWP monitors compliance of bulk entitlements, however there is an opportunity to better clarify and report on actions.

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts

- **Limited** – There is not a published single set of codified trading rules in the western regulated surface water system and trade arrangements vary depending on the product being traded and where it is moving to.

g) Transactions are cost-effective and timely (including transactions with government and intermediaries)

- **Limited** – Transactions are far from cost-effective or timely, often being complicated by differences in entitlement characteristics, or supply by agreement arrangements, and a lack of clearly defined trade rules.

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)

- **Not yet assessable** – It is not reasonable to make an assessment of effectiveness at this point in time. There have been too few trades to assess if trade is occurring in accordance with supply and demand fundamentals and intermediaries are not yet present in any significant capacity.

i) Timely, accurate and readily accessible market information

- **Limited** – There is generally limited market information available. Price discovery is possible but a lack of information contributes to delays and complexity in trade execution. Level of participant satisfaction regarding market information is low (based on input from workshops). Some of this is to be expected given the current state of development.

j) Water is efficiently distributed through the market across space and time

- **Limited** – There have been examples where water has moved (traded) between uses (e.g. to the environment). However, trade to date has been minimal and cumbersome.

3.3.5. Assessment summary and areas for improvement

The western regulated surface water market is relatively less developed and cannot be considered as an effective market in its current form. Current levels of development may reflect historically low demand for trade although there is some evidence of potential demand from a range of different users, including environmental, urban and recreational users. While some fundamentals are present there are a range of areas where processes and arrangements would need to be further developed for an effective water market to emerge.

In pursuing areas for improvement, it will be important to consider the context of current and future demand for trade, which will inform the extent to which market development is warranted. As such, the opportunity for improvement is to investigate market design and reform options that are fit for purpose in the western market. Beyond this, other (follow-on) opportunities include: guidance on how to trade under current arrangements (and more broadly improving market information); standardising

approvals for like trade types; clarifying the basis for trade approvals and ensuring consistency and transparency in process and outcomes; clarifying tradeability of existing rights; investigating options to increase tradeability; codifying trade rules and system constraints; and improving governance arrangements.

3.4. Unregulated surface water markets

3.4.1. Market characteristics

The unregulated surface water market is defined by the resource type rather than geography (i.e. it includes unregulated surface water systems across the entire state). Unregulated systems are water courses without infrastructure that control flow (in contrast to regulated systems like the northern regulated surface water market, there are no storages or means to control flow and water delivery). Some unregulated systems are connected to regulated systems and trade between them is possible subject to trade rules.

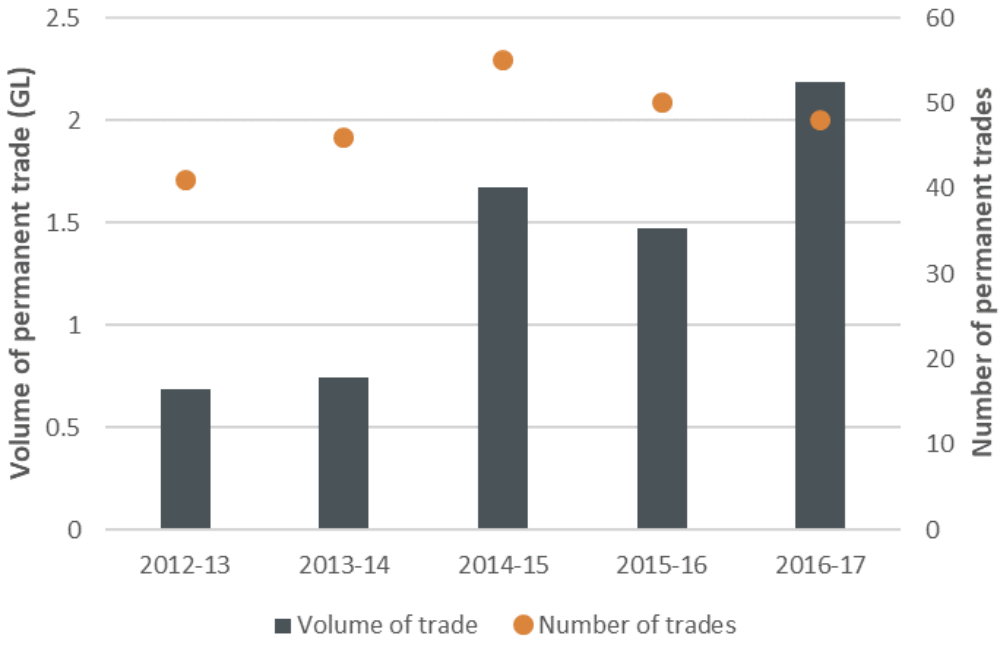
Unregulated streams or water courses cover the entire state, but the nature and level of use and development associated with them varies, and may involve commercial and non-commercial uses, stock and domestic use, as well as irrigation. In general, they may support smaller enterprises given the lower volumes of water available, and less reliable nature of flows.

Rural water corporations manage unregulated systems within their jurisdictions, handling licence administration, facilitating trade and managing the water resource.

3.4.2. Trade summary

Permanent trade of take and use licences (often referred to as section 51 licences, based on the *Water Act*) across unregulated surface water markets is minimal compared to trade of water shares in regulated markets, amounting to less than 2.5GL per year for the past five years and comprised of less than 60 trades per year (Figure 7).

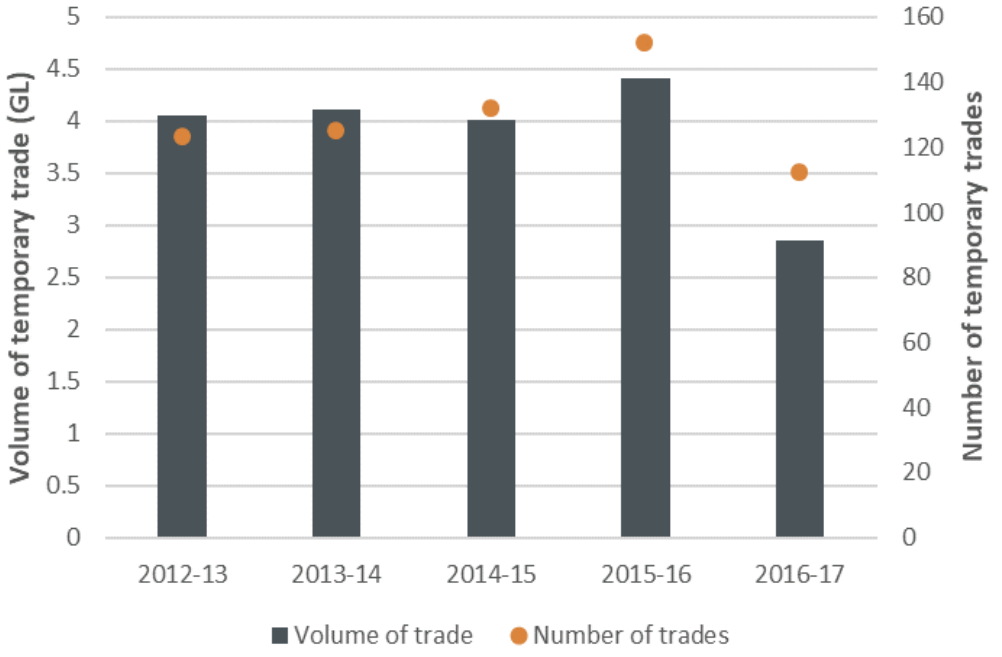
Temporary trade of take and use licences is higher than permanent trades, but is still relatively low, ranging between less than 3GL to 4.5GL per year. The number of trades is also slightly higher; ranging between around 90 and 150 trades each year for the last five years (Figure 8).



Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered (except for 2012-13 8.5GL trade which has been removed), and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 7 Unregulated surface water market permanent trade volume and number



Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 8 Unregulated surface water market temporary trade volume and number

3.4.3. Assessment of pre-conditions for trade

An assessment of the preconditions in this market area suggests that demand for trade will be variable due to the nature of the unregulated systems or watercourses in question, but that overall, given their size and fewer users and volume of resource, there will be less demand for trade than other market areas or resource types (unless connections to regulated systems are realised).

Table 7 Pre-conditions for trade

Pre-condition	Description
Scarcity	Mostly fully allocated but varies between systems
Variability in supply	Yes, by nature of resource type
Connectivity	Limited to within system, or where connects to a regulated river
Sufficient users	Varies between system, but often fewer users
Heterogeneous demand	System dependent
Changing demand	Yes, generally increasing, but system dependent
Relative demand for trade	**Low** (variable) (unless connections to regulated systems realised)

3.4.4. Assessment of unregulated surface water market

Below are the assessments made for each criterion for the unregulated surface water market (refer to Table 3 for description of High, Medium and Limited).

a) Clearly defined cap(s) on the available resource

- **Medium** – While caps are in place they are often established through a range of mechanisms, and it is difficult to find a consolidated list of these. In some areas, where there is a gap between the cap set and the level of entitlement on issue, unallocated water is available. Reporting against caps and processes for review of caps could be made more transparent.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks

- **Medium** – Licences may be traded in part or in full on a temporary or permanent basis. Take and use licences are issued on set timescales (up to 15 years) with no guarantee of renewal (however in most cases renewal is unlikely to be an issue). Licences also contain use conditions and are therefore not fully separated from land. Trade is possible, however could feasibly be less restrictive.

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)

- **Medium** – Systems are largely managed at the local scale by rural water corporations in accordance with the *Water Act,* ministerial polices and localised plans which help to establish sound governance and regulatory arrangements. Similar to other markets, roles and responsibilities established under these instruments may need to be reviewed and revised over time and planning processes could be better aligned and streamlined.

d) Robust and functioning water trade register

- **Medium** – Unregulated surface water trade is recorded in the Victorian Water Register and reported annually in the State Water Accounts and the Water Trading Annual Reports. However, there is more limited trade information made publicly available than for water share trades in regulated systems. Register functionality for managing bundled take and use licences is less user-friendly than for unbundled entitlements and could be improved. Some other issues identified with the Register for the other market areas also apply to this market area (e.g. data quality or completeness).

e) Cost-effective and risk-based monitoring and enforcement for water resource rights

- **Medium** – Rural water corporations are generally responsible for monitoring and enforcement. It was beyond the scope of this assessment to determine the efficacy of the programs run by the different water corporations. It was difficult to find information on monitoring and enforcement regimes which suggests reporting could be improved however, there is no evidence of major issues with current compliance levels.

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts

- **Medium** – State-wide trading rules are defined in the *Policies for Managing Take and Use licences* and reflected in local planning (unless a statutory Streamflow Management Plan is in place). State-wide trading rules are generalised and conservative to manage impacts of trade, however this can also act as a barrier to participation in the market. Trade from unregulated to connected regulated systems can occur but differences in entitlement structure make processes difficult.

g) Transactions are cost-effective and timely (including transactions with government and intermediaries)

- **Medium** – Transaction costs are generally higher for unregulated system trade than for regulated systems. Trade applications are manually processed by rural water corporations, requiring checks both on and off the Register. Processing times are not published on the Register (unlike for declared systems) and times can vary. There is a general lack of intermediary services and so trades often require more information gathering by participants.

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)

- **Medium** – The same frameworks for anti-competitive behaviour that apply to other markets apply to unregulated surface water markets. Given the formative nature of unregulated surface water markets, anti-competitive issues have generally not been reported or do not appear to be an issue in the minds of stakeholders or participants. Participants' knowledge about trade and competition frameworks could be improved over time.

i) Timely, accurate and readily accessible market information

- **Medium** – Information about trading processes and opportunities largely rests with water corporations and there is variation across the state regarding the extent to which market information has been developed. Some have made efforts to improve information in support of trade, but for many markets, information about prices will be difficult due to small numbers and infrequent trades.

j) Water is efficiently distributed through the market across space and time

- **Medium** – This is likely to depend on the system, however there are the necessary arrangements in place to support this outcome and the presence of trade activity in many systems suggests reallocation between uses or users is occurring. System complexity and the nature of entitlements and policies as well as transaction costs may limit efficient distribution of water. However, a key issue may also be a lack of demand for trade in some systems.

3.4.5. Assessment summary and areas for improvement

The unregulated surface water market is a formative market, with low volumes and numbers of trade to date. Bearing this in mind, it appears to be operating at a reasonable level commensurate with the state of development.

Like the western and groundwater markets, reforms in the unregulated surface water market must be commensurate with underlying demand for trade. The opportunities for improvement identified for this market include: engaging directly with users about the scope and demand for greater trade; undertaking a targeted education and awareness raising campaign on the benefits of and processes for trade, and monitoring the results; and, considering the potential for entitlement reform (greater separation of rights) and streamlining of water planning.

3.5. Groundwater markets

3.5.1. Market characteristics

Similar to the unregulated surface water market assessment, for the purposes of this assessment the groundwater market is considered a statewide market, while in reality trade is constrained (in most cases) to users within a management zone or other spatial unit that is primarily aligned with an aquifer or connected aquifers. This means there are several smaller markets within the state.

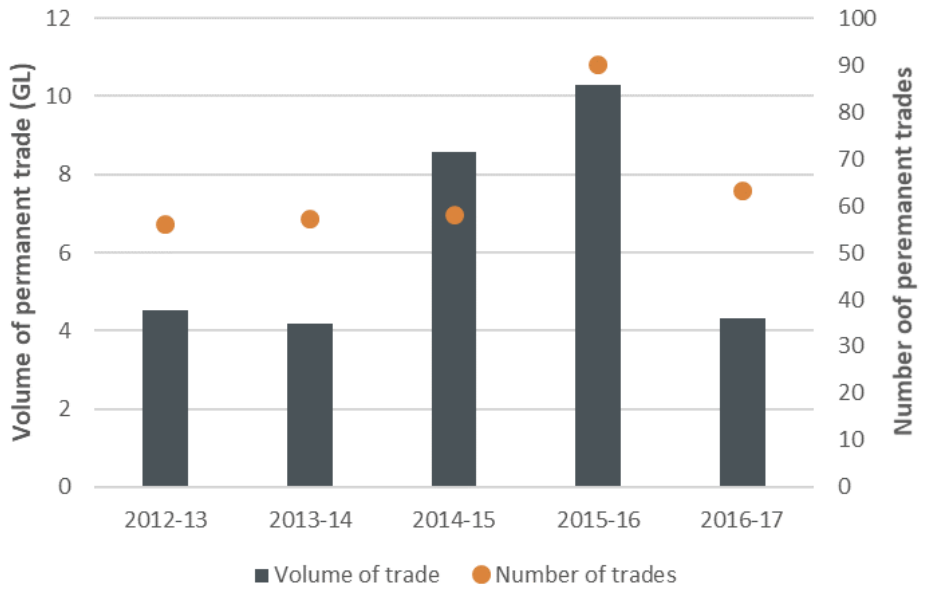
Groundwater in Victoria is administered across multiple scales. Groundwater resources are divided based on five major groundwater basins which are used for planning and reporting purposes. Groundwater management units (GMUs) are discrete areas where specific groundwater management rules are defined, with two subcategories: Groundwater Management Areas (GMAs) and Water Supply Protection Areas (WSPAs). Unincorporated Areas (UAs) are areas which often contain unquantified groundwater of varying yield and quality that has not been designated as either a GMA or a WSPA. Groundwater management zones are zones of intensive use where interference has, or may, occur due to high extractions. These are defined in management plans for some GMUs and have defaulted to trading zones in many cases. Groundwater Sustainable Diversion Limit resource units are established under the Murray-Darling Basin Plan and define areas for reporting under the Plan.

Given the area and different resource locations covered by this market area, there are a range of actual or potential uses and users, with varying water needs and other characteristics that affect demand for groundwater resources or trade (including surface water availability). Groundwater use and trade is most developed in the north of the state; however, groundwater trade has been increasing steadily in recent years with trade observed in many locations.

3.5.2. Trade summary

Permanent trade of take and use licences (often referred to as section 51 licences, based on the *Water Act*) across groundwater markets is minimal compared to trade of water shares in regulated

markets, ranging between 4.1GL and 10.3GL per year for the past five years. Trade numbers have ranged between 57 and 90 trades. This information is shown in Figure 9.

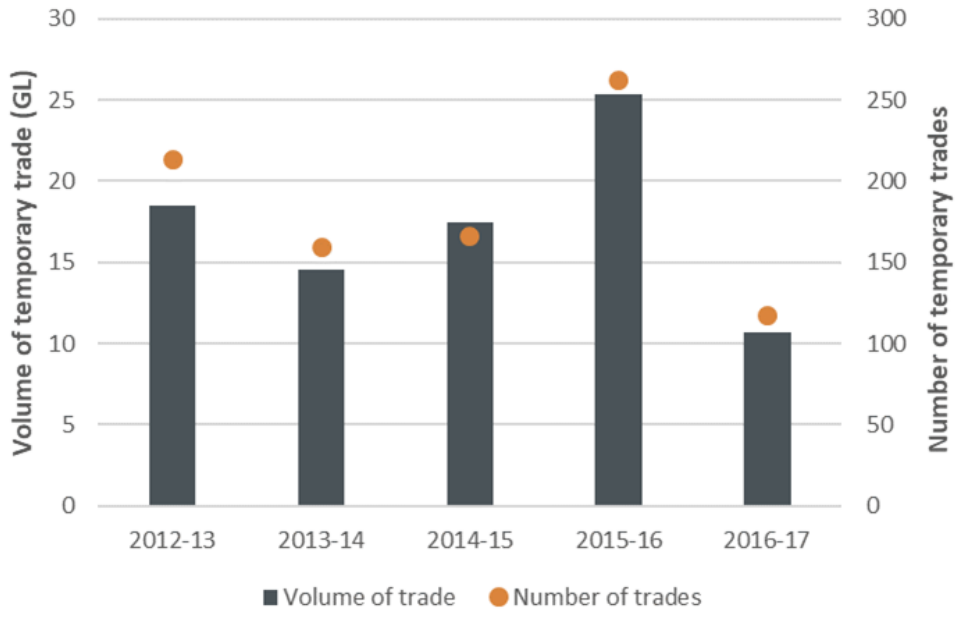


Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 9 Groundwater market permanent trade volume and number

Temporary trade volumes have varied between less than 10.6GL to just over 25.4GL, with more trade occurring in recent years (peaking at 262 trades in 2015-16) (see Figure 10).



Source: Victorian water register data from October 2017

Notes: Data for trade volumes and number of trades is unfiltered, and includes environmental and related party trades. Trade statistics may vary to those reported in the Victorian Water Trading Annual Report due to differences in filtering and/or market aggregations.

Figure 10 Groundwater market temporary trade volume and number

3.5.3. Assessment of pre-conditions for trade

An assessment of the pre-conditions in this market area suggests there is likely to be significant variation in demand for groundwater trade, however overall there is likely to be increasing demand, particularly in systems that are relatively large or where surface water availability is decreasing.

Table 8 Pre-conditions for trade

Pre-conditions	Description
Scarcity	Varies between systems, fully allocated in some areas
Variability in supply	Relatively lower (but restrictions sometimes in force)
Connectivity	Generally low (i.e. discrete systems)
Sufficient users	Variable depending on the system, but generally low numbers
Heterogeneous demand	System dependent
Changing demand	Yes, generally increasing (particularly in areas where surface water is variable or scarce)
Relative demand for trade	**Medium**

3.5.4. Assessment of groundwater market

Below are the assessments made for each criterion for the groundwater market (refer to Table 3 for description of ratings).

a) Clearly defined cap(s) on the available resource

- **Limited** – A consolidated list of caps is provided in the Victorian Water Accounts and caps are reported against. In some cases, the basis on which caps have been set could be supported by more robust evidence and underlying conditions have changed since caps were first set. There are issues from overlap and misalignment between different caps and planning arrangements (primarily from the transition to Basin Plan Sustainable Diversion Limits). In some areas, where there is a gap between the cap set and the level of entitlement on issue, unallocated water is available. In some cases, processes for accessing this unallocated water could be made more transparent. In unincorporated areas there is no current cap and so no need to trade as new licences may be issued by the corporation.

b) Property rights to the water resource have clear characteristics, are legally secure, readily tradeable and, have appropriate supporting frameworks

- **Medium** – Licences may be traded in part or in full on a temporary or permanent basis. Take and use licences are issued on set timescales (up to 15 years) with no guarantee of renewal (however in most cases renewal is unlikely to be an issue). Licences also contain use conditions and are therefore not fully separated from land. Trade is possible, however could feasibly be less restrictive.

c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)

- **Medium** – Systems largely managed at the local scale by rural water corporations in accordance with the *Water Act*, ministerial polices and localised plans which help to establish sound governance and regulatory arrangements. Similar to other markets, roles and responsibilities

established under these instruments may need to be reviewed and revised over time and planning processes could be better aligned and streamlined.

d) Robust and functioning water trade register

- **Limited** – Groundwater trade is recorded in the Victorian Water Register and reported annually in the State Water Accounts and the Water Trading Annual Reports. However, there is more limited trade information made publicly available than for water share trades in regulated systems. Register functionality for managing bundled take and use licences is less user-friendly than for unbundled entitlements and could be improved. In addition, further issues have arisen in the transition to Basin Plan Sustainable Diversion Limits. Some other issues identified with the Register for the other market areas also apply to this market area (e.g. data quality or completeness).

e) Cost-effective and risk-based monitoring and enforcement for water resource rights

- **Medium** – Rural water corporations are generally responsible for monitoring and enforcement. It was beyond the scope of this assessment to determine the efficacy of the programs run by the different water corporations. It was difficult to find information on monitoring and enforcement regimes which suggests reporting could be improved however, there is no evidence of major issues with current compliance levels.

f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts

- **Limited** – Groundwater trade rules are largely set at the local level (in management plans), and are administered by water corporations (which allows for more system specific rules and management). The rationale and basis for trade rules and zones could be reviewed and clarified (including ensuring trade is not used to address other water management issues, which is inconsistent with National Water Initiative commitments).

g) Transactions are cost-effective and timely (including transactions with government and intermediaries)

- **Limited** – Trade application, processing and approvals processes can take much longer and involve more cost for groundwater than surface water. This may be due to more complex resource considerations (as required by the *Water Act*) and lack of use of register functionality, but could also be due to the bundled nature of the entitlement and use and delivery considerations being conflated with resource assessments.

h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)

- **Medium** – The same frameworks for anti-competitive behaviour that apply to other markets apply to groundwater. Given the formative nature of groundwater markets, anti-competitive issues have generally not been reported or appear to be an issue in the minds of stakeholders or participants. Knowledge of participants about trade and competition frameworks could be improved over time.

i) Timely, accurate and readily accessible market information

- **Limited** – Information about trading processes and opportunities largely rests with rural water corporations and there is variation across the state regarding the extent to which market information has been developed. Participants were not surveyed for this assessment, but prior

investigations by DELWP[7] and stakeholder input from workshops suggested there is a need to improve market information, and transparency around processes to trade and approvals.

j) Water is efficiently distributed through the market across space and time

- **Medium** – Groundwater trade is occurring and has increased over time, particularly in areas where surface water is scarce, which suggests there is redistribution occurring. However, this will have natural spatial limits dependent on groundwater systems. Issues identified above, particularly around the nature of entitlements, trade rules and planning arrangements as well as transactions costs, and market information, may be reducing the efficiency of distribution of water. However, a key issue may also be a lack of demand for trade in some systems.

3.5.5. Assessment summary and areas for improvement

Similar to unregulated surface water markets there appears to be many of the fundamental market elements in place to support a market, albeit with less clarity and certainty around some aspects (e.g. caps and trade rules). As a whole, the groundwater market is a formative market, with low volumes and numbers of trade to date. Bearing this in mind, it appears to be operating at a reasonable level commensurate with the state of development.

Any reform in the groundwater market must be commensurate with underlying demand for trade. Consistent with this, low risk actions could include further engagement with groundwater users about the scope and demand for greater trade, and undertaking a targeted education and awareness raising campaign on trade and monitoring the results. Opportunities involving more substantial action include addressing any deficiencies with caps; streamlining of planning processes; clarifying management and trade zones and their interaction, including underlying principles; considering the potential for entitlement reform (greater separation of rights), and; improvements to trade rules. In the interim, there may be a need to address issues with how current management zones and the Basin Plan Sustainable Diversion Limits interact or align, and to better consolidate current trading rules which are documented across many local management plans.

[7] See “Groundwater trading rules analysis” report prepared by Cardno for DELWP.

4. Summary, lessons and ongoing reporting

This section combines the assessments across the five market areas and links them to the water market objectives outlined at the beginning of this report. It also discusses some of the common themes and areas for improvement across markets and how future actions might be focused, and provides a brief conclusion.

4.1. Overall summary assessment across markets

The assessment shows the different market areas across the state are at different levels of development, and their effectiveness and performance reflect this. In general, the fundamental elements for an effective market are largely in place across most of the five market areas (though some gaps exist), and the ongoing functional requirements require more effort (both in developing and developed markets).

Markets are working effectively in the **northern regulated surface water market** area with fundamental market architecture and ongoing functional requirements in place. A high level of trade indicates significant benefits from water being distributed efficiently across space and time. Improvements in northern Victoria will thus need to focus on how growing demand and sophistication in the market is best managed. This includes ensuring that optimal trade rules, processes and governance arrangements are in place, that deliverability constraints are well managed, that market participants are well informed, and that the potential for anti-competitive behaviour is monitored and managed appropriately.

For the **unregulated surface water** and **groundwater markets**, performance appears consistent with the level of development of the market. Strengthening the fundamental architecture requirements of these water markets, and improving operation and understanding at the local level appear as the main areas for possible improvement. It was also observed that there may be lower demand for trade in **unregulated surface water,** while there may be more prospects for increased trade in **groundwater markets** (based on the assessment of pre-conditions).

While the irrigation systems in the **southern regulated surface water market** operate at a similar level to northern Victoria, there is untapped trade potential associated with further developing the urban market and greater integration of urban and rural markets across the Victorian water grid. Integrating and developing the south-central market will require a significant design and development process, but there may be potentially significant benefits in pursuing this. There are also a number of more immediate 'no regrets' improvements that could be implemented to better enable trade between bulk entitlement holders in the south-central market.

There is also potential for more fundamental improvements to be made in the **western regulated surface water market** in order to improve effectiveness. While there are fewer users than the south-central market and some unallocated water, the variability of supply and diverse users and increasing scarcity due to climate change suggests there may be benefits in better facilitating trade. However, it should be noted that any changes should be informed by a clear definition of demand for trade, and actions should only be pursued where cost-effective.

Table 9 below shows the overall ratings against each criterion for each market – this should be considered with regard to the rating system (Table 3) in Section 2 and the written assessments against criteria for each market in Section 3.

Table 9 Summary of market area performance against criteria

Criteria		Northern	Southern	Western	Unregulated	Groundwater
Fundamental market architecture	a) Clearly defined cap(s) on the available resource	**High**	**High**	**Medium**	**Medium**	**Limited**
	b) Property rights have clear characteristics, are legally secure, readily tradeable, and have appropriate supporting frameworks	**High**	**High**	**Limited**	**Medium**	**Medium**
	c) Sound governance and regulatory arrangements (including for market operation and operators, and government market participants)	**Medium**	**Medium**	**Limited**	**Medium**	**Medium**
	d) Robust and functioning water trade register	**High**	**High**	**Medium**	**Medium**	**Limited**
	e) Cost-effective and risk-based monitoring and enforcement for water resource rights	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)	**Medium** (due largely to a lack of transparency)
	f) Clearly defined trade rules are working effectively to address hydrologic and environmental third party impacts	**High**	**High**	**Limited**	**Medium**	**Limited**
Ongoing function	g) Transactions are cost-effective and timely (including transactions with government and intermediaries)	**High**	**High**	**Limited**	**Medium**	**Limited**
	h) Absence of anti-competitive practices or behaviour (by any market participants including intermediaries)	**Medium**	**High**	Not (yet) assessable	**Medium**	**Medium**
	i) Timely, accurate and readily accessible market information	**Medium**	**Medium**	**Limited**	**Medium**	**Limited**
Out-come	j) Water is efficiently distributed through the market across space and time	**High**	**Medium**	**Limited**	**Medium**	**Medium**

Definition of ratings:

High - *satisfies most indicators to a high level*: In aggregate, the market is performing effectively against the criterion – noting that there may still be a need for further development and improvement in discrete areas, or to match growing demand and sophistication of the market

Medium - *satisfies around half of the indicators to a high level, or most indicators to a reasonable level*: The market may be considered as somewhat effective, however there are some significant gaps and/or areas for improvement that could be considered.

Limited - *only satisfies a few indicators, or only satisfies several indicators to a very limited level*: The effectiveness of the market against the criterion is limited at present and change would be required to make the market effective – noting that this may not mean reform is warranted (particularly if there is low demand for trade / development).

4.2. Summary of performance against objectives

Summary of performance against objectives

Water markets are generally contributing to the desired outcome of 'equitable access to and efficient sharing of water resources', with ongoing improvements and refinements required. Further improvements to water markets will help support *Water for Victoria's* more general objectives to support a healthy environment, a prosperous economy, and thriving communities, now and into the future.

A brief summary of performance against each of the five water market objectives is provided below.

Objective 1: Water markets contribute to the efficient distribution of water (through the market) across social, cultural, economic and environmental uses

This objective is likely to be met when the other objectives below are also satisfied – and thus, this objective links to almost all elements of market effectiveness. However, of particular relevance are ensuring caps on the resource are set, robust property rights and trades rules are in place, and that transaction costs are cost-effective and anti-competitive behaviour is managed appropriately.

In the northern market, the fundamentals of an effective water market are in place (e.g. caps on water resource, clearly defined property rights, a functioning water register, appropriate trade rules etc.). This all enables water to be traded through the market, contributing to efficient distribution across different uses. The high levels of trade in the northern system provide supporting evidence that water markets are contributing to this objective. Similar conclusions may also be drawn for declared irrigation systems in the southern regulated surface water market area, although the level of trade activity is much lower.

Across other markets, there is evidence to suggest that more could be done to meet this objective. In the unregulated surface water market and groundwater markets, more needs to be understood about demand for trade and there may be work to do in streamlining water planning and reforming entitlements. In the western market, fundamental institutional settings that provide for effective tradeable property rights, and sound governance and regulatory arrangements need, to be further developed or improved – this will help to support other aspects of the market (such as robust trade rules and lower transaction costs), and lead to more efficient distribution of water through the market. This is also relevant to development of the south-central water market.

Across all markets there is an opportunity to improve information on and for Traditional Owner (and other potential new market participants) participation in the market and to better recognise cultural and social values.

Objective 2: Water markets operate efficiently

Water markets in the northern regulated surface water system operate efficiently with low cost transactions and a relatively liquid market. The southern regulated surface water market performs similarly in this respect in irrigation systems. The Victorian Water Register provides the basis for enabling efficient trade operations and much of the functionality that drives efficient trade in the north and south is applied state-wide. However, there is room for improvement in the efficiency of trades outside of the declared systems in the north and south, including for groundwater and unregulated surface water systems which are more difficult to process by the nature of the entitlements. Efficiently operating markets are not yet in place in the western regulated system with many of the requirements

for rapid and cost-effective transfers not yet in place. This is also relevant to development of the south-central water market.

The arrangements in the north of the state work well, particularly in enabling rapid and cost-effective transfers, particularly of allocation. However, there are improvements that could be made to improve market information and address concerns about confidence in water market intermediaries, both of which could improve price discovery and reduce transactions costs (outside of government charges).

Objective 3: Third party impacts of water trading are managed appropriately

Appropriate trade rules, governance and regulatory arrangements, and supporting property right frameworks (e.g. deliverability and irrigation district pricing) are the main elements of the market which support this objective.

Trading rules are most developed in the northern market and are generally working effectively (with previous limits on trade that were not based on third party impacts removed). Critically, there was no strong evidence of inappropriate use of water markets policy and rules to address other areas of policy such as managing regional and economic adjustment (which is more effectively managed through other levers rather than through trade). However, trade rules based on hydrologic or third party rationale have remained relatively unchanged over time despite growth in trade (including interstate), as well as changes to trading patterns and water use. Victoria is continuing to work with the MDBA and other Basin states to ensure these arrangements are appropriate. This work is part of Action 9.6 in *Water for Victoria*.

More broadly, delivery shares aim to control third party impacts of changes in the location of extraction through providing rights to delivery. While the principle for this is sound, there are concerns that extraction share limits and delivery shares are not well understood by market participants.

Trade rules in southern regulated surface water markets are performing similarly to those in the north. While outside of the northern and southern regulated surface water systems, trading rules for groundwater and unregulated surface water systems are less mature and more cumbersome, reflecting the underlying bundled nature of the entitlement. Trade rules are not defined in the western regulated system. This means that cumbersome bespoke assessments are required which form a barrier to trade as they increase time and cost, and reduce certainty around the approvals process. This is also relevant to development of the south-central water market.

Establishing appropriate means of managing third party impacts of water trading is a critical role for government. Concern about potential third party effects is one of the main challenges to manage in expanding water markets. Therefore, further investment in understanding these third party impacts, assessing the benefits and costs of improved management, and then implementation and monitoring of rules is important in further market development, as is communicating the effectiveness of the mechanisms already in place in order to build support for further market development.

Objective 4: Participants have open and non-discriminatory access to water markets

Open and non-discriminatory access is important for the function of water markets. It supports equitable participation through creating an open playing field, and allows for new entrants to access water (and provides the option for existing holders to exit the market). This objective is principally supported through clear and non-discriminatory property rights and trade rules, as well as management of anti-competitive behaviour and sound governance and regulatory arrangements. The presence of non-discriminatory property rights (i.e. no one is discriminated from holding a right based on their characteristics) and well-defined trade rules in most markets, mean that this objective is largely being met.

Significant reforms have been implemented in the northern regulated system to provide open and non-discriminatory access. These generally apply in other markets however there are limitations in place in some areas that inherently reduce the types of participants – e.g. there are requirements for groundwater and unregulated surface water licence holders to also own land given the nature of the take and use licence they hold. There are a range of issues to consider in determining whether further reform is warranted is this regard.

More broadly, improvements to monitoring and management of anti-competitive behaviour, better market information, lower transaction costs and other elements of an effective market will lead to further improvements.

Objective 5: Participants have confidence in market rules, regulations and institutions and can make informed decisions

This objective is informed by almost all of the criteria and was a common theme throughout the assessment. While the best measure of confidence and participant decision-making would be through participant surveys, this was not in scope for this review, and thus it is hard to make a judgement. However, anecdotal evidence, and views from the stakeholder workshops underscored the importance of market confidence (particularly for compliance, intermediary services, market information and management of anti-competitive behaviour) and that there are opportunities to improve.

In many markets, stakeholders noted that the (often inherent) complexity of water markets works against market confidence, particularly in the absence of ongoing education and simple, useful information. Despite this, the amount of water traded and the significant investment in water and associated uses (such as irrigation) suggests participants increasingly trust and rely on water markets.

Less developed markets are unlikely to be performing as well against this objective. This could be due to a lack of readily accessible information that explains the arrangements to participants, such that they can have confidence, but it may also reflect the less well developed nature of institutional arrangements in those markets.

4.3. Lessons

This assessment is the first in what is intended to be an ongoing series of market effectiveness reviews which will help to continually identify improvement opportunities, and to track and communicate the effectiveness of water markets. The project also required development of an assessment framework for assessing water market effectiveness.

From the project, a number of important lessons and reflections have emerged which can be used to guide future assessments. These are summarised below:

4.3.1. Overarching lessons

As a result of the assessment the follow overarching lessons emerged:

- **An enduring definition of water market effectiveness is important** – the criteria and objectives developed for this project should be used for future assessments of water market effectiveness

- **Indicators will require refinement and adaptation over time** - the indicators developed for this project should be refined and adapted overtime to better inform the assessment and meet evolving market needs.
- **Market participant input is key** – many aspects of market effectiveness relate to participant confidence and understanding, future assessments will benefit from further engaging with stakeholders.
- **Assessing water market effectiveness is not always an exact science** – the high-level nature of this type of assessment (across the five market areas) necessitates some degree of aggregation, generalisation and judgement.
- **Economic assessment of trade outcomes and benefits is a potential gap –** appropriately contextualised economic analysis could be used to supplement future assessments, this will help address measurement of market outcomes which was a key challenge in this assessment.
- **There may be value in wider application of the market effectiveness framework** – stakeholders indicated that the assessment framework could be applied at the sub level (e.g. in particular market zones or systems) or, more broadly across the southern MDB.
- **Value of the framework in planning processes and other initiatives** – the assessment and assessment process has been a useful way to identify possible approaches to addressing a range of water policy and management challenges through a user-oriented perspective.

4.3.2. Ongoing reporting

To ensure reporting is followed through with, it would be better, in principle, to make modifications to existing reporting activities and find ways in which reporting requirements could be addressed through existing commitments. This may help to minimise the resourcing burden and limit new costs, and increase the probability that reporting will continue.

Approach and form of reporting

Future assessment and reporting (and analysis used to support it) should be consistent with, and apply the assessment logic and framework developed in this project and presented in this report. This means that future assessments should be completed by applying the objectives, assessment criteria, and indicators, established here. Reporting and assessment should be completed at the indicator level and summary assessments completed at the criteria level.

While the water market objectives are fixed, and the assessment criteria should also generally be considered fixed, consideration as to the ongoing suitability of indicators could be reassessed whenever a detailed assessment is undertaken. This should reflect on the costs and benefits of the indicators in question (such as how labour intensive or financially costly it was or will be to report against certain indicators). At such time, frequency of reporting could also be reconsidered if necessary.

Schedule

A major and complete assessment across the whole assessment framework for all market areas is not a small task, but also does not need to be completed frequently. A major assessment is probably only warranted every three to five years. This is appropriate given the likely pace of change, but also because in the intervening time, investigations into specific issues identified in the previous overarching assessment would need to be completed, and any changes or reforms agreed, further developed, and implemented. Time is required to make such changes and ensure they (and their resultant effects) can be reflected in subsequent assessments.

As noted above, there are several means by which to update existing reporting activities to address issues identified in this assessment. Doing so may mean that reporting frequency is increased in certain areas, but some of these will end up becoming part of ongoing 'business as usual' reporting activities, rather than only being reported as part of three to five yearly detailed assessments (for example ongoing annual compliance reporting). Similarly, water corporations may undertake surveys annually, and therefore data collection to support the three to five yearly detailed assessments would be collected annually, but not necessarily be assessed and reported on in detail every year (although some elements could be reflected in the Victorian Annual Water Trading Report if there was a case to do so).

Appendix A – Water market objectives

The following provides an extended statement of the objectives with additional explanatory text, and reflects the agreed final DELWP position on water market objectives. Further information on the development of, and rationale for the objectives, is also provided following the objectives.

Objective 1:

*Water markets contribute to the **efficient distribution** of water (through the market) across social, cultural, economic and environmental uses.*

Where:

- efficient distribution is considered as the distribution of water across different users and uses in a way that maximises *value* (i.e. allocative efficiency), and where;
  - *value* is considered across social, cultural, economic and environmental dimensions.
- a defined cap on the water resource is in place that ensures long term sustainable extraction limits.

Objective 2

*Water markets **operate efficiently**.*

Where:

- fees and charges for trade reflect efficient costs
- market arrangements mean that other transactions costs (e.g. legal fees, costs of information and advice) are efficient.

Objective 3

***Third party impacts** of water trading are managed appropriately.*

Where:

- Third party impacts are defined as:
  1. Third party impacts from **movement** of water to a different location(s) on:
  - Entitlement reliability (of supply): including irrigators and the environment (as a holder of water rights), best managed through trade rules
  - Deliverability (due to hydrological changes): including irrigators and the environment (as holder of water rights), managed through delivery instruments and possibly trade rules
  - Environment: associated with change in hydrology, may be managed by trade rules and other instruments
  2. Third party impacts from **change in location of use**:

- Environmental impacts of change in location of water use (for example changes in salinity), best managed through controls on water use
- Commercial impact on irrigation corporations and their customers through changes in location of take (managed through delivery shares, and pricing)

3. Third party impacts from **flow on effects** of market transactions into local economies

- Flow on effects to communities (e.g. water markets facilitating transition of water to other areas of more productive use, resulting in economic decline in other regions). Best managed by rural adjustment policy, if necessary, not water policy - but ensure that water market information is provided to appropriate areas within government to support decision making.

- appropriate management should seek to balance the costs and benefits of addressing impacts, and ensures that impacts are addressed using appropriate policy instruments or tools,
- appropriate management tools include trade rules, delivery instruments, controls on water use, delivery shares and pricing in certain circumstances
- inappropriate management includes attempting to use water market policy to manage issues better dealt with by other areas of policy, such as managing regional and economic adjustment
- third party impacts are not the impacts between a buyer and a seller from completing a transaction.

Objective 4

*Participants have **open** and **non-discriminatory** access to water markets.*

Noting that:

- third party impacts are to be appropriately managed (as per Objective 3)
- there are no barriers to trade based on the characteristics of participants
- non-discriminatory ownership does not enable misuse of market power.

Objective 5

*Participants have **confidence** in market rules, regulations and institutions and can make informed decisions.*

Where:

- institutions include government and non-government entities (including market operators and brokers), and other arrangements supporting market operation (e.g. legally strong entitlements)
- participants' confidence in the market is:
  - supported by transparency and adequate information
  - not undermined by government interference and political uncertainty.

Appendix B – Mapping criteria to objectives

Table 10 **Relationship between objectives and assessment criteria**

Objective / Criteria	(a) Clearly defined cap(s)	(b) Property rights	(c) Governance and regulation	(d) Trade register	(e) Monitoring and enforcement	(f) Trade rules	(g) Transaction costs	(h) Anti-competitive behaviour	(i) Market information	(j) Efficient distribution
(1) Allocative efficiency	✔	✔				✔ ✔	✔	✔	✔ ✔	✔ ✔ ✔
(2) Operating efficiency			✔ ✔	✔ ✔ ✔	✔	✔ ✔	✔ ✔ ✔	✔ ✔	✔ ✔	✔
(3) Third party impacts		✔	✔ ✔		✔	✔ ✔ ✔		✔	✔ ✔	✔
(4) Access & discrimination		✔ ✔ ✔	✔ ✔			✔ ✔ ✔	✔	✔ ✔	✔ ✔	
(5) Confidence and information	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔	✔ ✔ ✔	

Note: The number of ticks indicates the extent of the relationship, with three ticks indicating the most relevance.

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