

Analysis of Investor Involvement in the Southern Murray Darling Basin

Report prepared for
Cobram Estates

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This report has been prepared as outlined with Cobram Estate in the Scope Section of the engagement letter. The services provided in connection with this engagement comprise an advisory engagement, which is not subject to assurance or other standards issued by the Australian Auditing and Assurance Standards Board and, consequently no opinions or conclusions intended to convey assurance have been expressed.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by, Cobram Estate personnel consulted as part of the process.

KPMG have indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

Overview

Cobram Estates (Cobram) engaged KPMG to conduct a review of the role of investors in the Southern Murray Darling Basin's (SMDB) water market. The objectives of the water market in the SMDB as set out in the Water Act 2007, including requirements for the Federal Government to operate efficient water markets and trading and to provide appropriate protection of third-party interests.

Cobram has expressed a lack of confidence in the operation of the water market, particularly the behaviour of investors.

As with other markets, there are conditions that must necessarily be met for the water market to work efficiently, including:

- 1 market transparency and the absence of information asymmetries;
- 2 the absence of other market failures (e.g., market power or externalities); and
- 3 appropriate governance arrangements.

This report investigates Cobram's concerns and considers potential distortions in the Southern Murray Darling Basin (SMDB) water market. The report is set out in two parts:

- A. Current governance issues in the water trading market (addressing market conditions 1 and 3 above)
 - Consistent with the findings of the ACCC, **there are deficiencies** in the settings for and governance of water trading that potentially undermine the efficiency of the water market. These deficiencies are contributing to mistrust in the functioning of the water market for irrigators such as Cobram. These deficiencies have also exacerbated the **risk** of market manipulation in the future.
 - As of August 2023, despite commitments from the Federal Government, no legislation has been put forward to address these deficiencies set out in the ACCC findings, meaning that the potential for market manipulation still exists.
- B. Cobram believes that the behaviour of non-consumptive water investors in the SMDB water market is having an adverse impact on farmers and farm communities during drought periods (relating to market condition 2 above). KPMG's high level analysis of Cobram's concerns suggests that they warrant further investigation. KPMG's key findings can be summarised as follows:
 - During drought conditions, the SMDB water market does not work like a textbook market. Misuse of market power or over-pricing caused by low-risk, high-return speculative activity by investors has the potential to distort the market and adversely impact farmers that depend on water availability and the local economies and communities in which the farmers operate and live.
 - The increased frequency and severity of droughts means there is an urgent need for the government to **review** the role of investors in the market specifically during drought periods.

In addition to a review of the role of investors in the SMDB market, Cobram also engaged KPMG to undertake a case study of the California water market and the California Assembly Bill 1205 that seeks to prohibit institutional investors from trading the experience in California to the SMDB market. KPMG found that there are significant differences in operation of the California water market to the SMDB and therefore it is difficult to draw any conclusions to apply to the SMDB. The full case study can be found in the Appendix of this report.

Context

Water trading occurs in both permanent (entitlement) water and temporary (allocation) water. Although this report only addresses allocation water trade, the role of entitlement water must also be noted. Allocation water is made available each season (and reviewed throughout the year) based on decisions by state water resource managers to allocate a percentage of the entitlement water. The entitlement water holders are, therefore, able to either use the water for their own consumptive purposes or trade it in the allocation market.

Irrigators need to have allocation water in their accounts prior to using it on their crops. They cannot 'catch up' by purchasing later in the year. This makes the timing of water purchases critical for irrigation. Irrigation activities include both annual and perennial crops, which differ in key respects (summarised in Table 1).

Table 1: Differences in annual and perennial crops

Annual Crops	Perennial crops
<ul style="list-style-type: none"> Water needed annually for planting decisions autumn/summer. Typically lower value products. Demand for water is more elastic, they have flexibility to decide not to plant (or plant less) according to water availability and cost. 	<ul style="list-style-type: none"> Water is needed to sustain , and in some cases keep alive, plantings through dry periods. Typically higher value products. Demand for water is relatively inelastic, becoming more so in extended dry seasons when farmers have little choice than to pay higher prices for water that is critical for sustaining the capital invested in the form of tree plantings.

Agricultural land use in the lower Murray Darling is trending away from annual crop production into higher value perennial production. Irrigated crop area data for the lower Murray Darling from the MDBA¹ shows that from the period 2003 to 2021 in the Lower Murray, seasonal plantings reduced by 34% or 26,285 hectares; while over the same period permanent plantings increased by 37% or 35,575 hectares. Similarly, data from the ABS shows a shift towards higher value farm activities (A Loch et al. 2021² and ABS³).

Active irrigators are the consumptive users of allocation water – that is, their priority is agriculture, meaning they will often have to go into the market to purchase water. Non-consumptive holders of water are also involved in water trading, both as entitlement holders and traders in the allocation market. These non-consumptive investors, including managed investment funds, are the focus of the analysis in this report.

Part A: Current governance concerns in the water trading market

Water is a scarce resource, and the water market is intended to be an effective way to facilitate efficient use of this scarce resource. Trading water between participants is supposed to allow water to move to its highest value use⁴. However, for markets to work efficiently there are conditions that need to be met, including: the absence of market failures; market transparency; and appropriate governance arrangements.

In 2021, the Australian Competition and Consumer Commission undertook a review of the SMDB Water Market (ACCC). The ACCC review found that the SMDB water market was functioning as it should, with **no evidence** of market failure or market manipulation. Nonetheless, the ACCC also concluded that **there are deficiencies** that cause mistrust and undermine the efficiency of the water market. This included the following key findings:

- A **lack of quality, timely and accessible** information for water market participants.
- Scant rules governing the conduct of market participants**, and no particular body to oversee trading activities, undermining confidence that the market is operating fairly and allocating water efficiently to its highest value use. In particular, water market intermediaries such as brokers and exchange platforms currently operate in a mostly unregulated environment, resulting in a lack of clarity regarding the role brokers play and permitting undisclosed conflicts of interest to arise.
- Trading behaviours that can undermine the integrity of markets, **such as market manipulation, are not prohibited**, insider trading **prohibitions are insufficient and information gaps make these types of detrimental conduct difficult to detect**.
- Differences in trade processes and water registries between the Basin States **prevent participants from gaining a full, timely and accurate picture** of water trade, including price, supply and demand.

¹ Irrigated crop area data for the lower Murray Darling 2003 to 2021 (mdba.gov.au)

² Loch et al. (2021), Markets, mis-direction and motives: A factual analysis of hoarding and speculation in southern Murray–Darling Basin water markets. *Agricultural and Resource Economics*, 65(291-317).

³ From the 2017-18 Rural Environment and Agricultural Commodities Survey (REACS), the scope was all agricultural businesses with an Estimated Value of *Agricultural Operations* (EVAO) of \$40,000 or greater. This is a change from previous surveys, where a scope of EVAO of \$5,000 or greater was used, and is a continuation of the scope used in the 2015-16 Agricultural Census.

⁴ Defined as the use that generates the highest return

To improve the operation of the market, the ACCC recommended a package of reforms that aimed to restore confidence in the market and to improve its operation and efficiency. The recommendations centred on the following themes:

- governance of the Basin water markets;
- market integrity and conduct;
- trade processing and water market information; and
- market architecture.

Further to the above, the ACCC also investigated the role that investors play in the water market. Investors are defined as actors that trade or manage water assets for the purpose of financial gain unrelated to the use of the water. The ACCC found that investors **contribute positively** to the water market through creating new sources of capital, improving liquidity and moving water to the areas of greatest demand.

The ACCC did not find any evidence of market manipulation or other misconduct by investors but acknowledged **that under the current settings of the market, there are risks of market manipulation**. The recommendations that were put forward by the ACCC could go some way to alleviating this risk.

An Independent Advisor was appointed to develop a roadmap for implementing water market reforms in response to the ACCC report. All 23 recommendations put forward were accepted by the Federal Government and the Basin States in October 2022. However, as of August 2023, legislation has not yet been introduced to address these recommendations.

Cobram's maintained concern is that the water market **is not a level playing field** during drought conditions when irrigators and local communities are most vulnerable. Cobram acknowledges that the ACCC's findings may apply in non-drought periods, or even mild drought periods. However, particularly in extreme drought conditions Cobram is concerned that the market is being distorted by the behaviour of investors. With only a small sample of data (in the context of weather cycles), including a limited coverage of periods that can be characterised as extreme drought conditions, it is difficult to reach statistically robust conclusions about market efficiency. This is particularly the case when the market is relatively immature, with its conduct and structure still evolving. Cobram are particularly concerned that not enough attention is being placed on the growing size and impact of non-consumptive water investors in the SMDB water market. Cobram believe that investor behaviour has negatively impacted the businesses of irrigators and their local communities, particularly in the drought period of 2018-2019. Cobram believes that the farm businesses dependent on water, and local communities dependent on these farm businesses, are vulnerable to larger investors exerting market power in periods of drought.

KPMG acknowledges Cobram's concerns and explores potential implications of market power and other market distortions in Part B. The water trading market is a financial market and the integrity rules that apply to the more established financial markets should also apply to the water market. Current settings leave the SMDB's water markets vulnerable to market manipulation and distortion. The legislation as proposed by the roadmap for water market reforms will lower this risk by increasing transparency and establishing more regulation in the processing of trades. The question is whether these reforms address the concerns expressed by Cobram.

Part B: Potential impacts of the growing number and size of non-consumptive investors in the market

Cobram sought KPMG's advice to explore the potential impacts that non-consumptive investors with market power could have on the SMDB water market and the potential adverse impacts that these investors could exert in periods of drought.

The water market will not be efficient at allocating water to its highest use if some players can exert market power. In an ideal market, there will be many buyers and sellers, none of whom can impact the market price individually or in concert with others by exerting market power. A special feature of the SMDB water market that makes it different to the textbook characterisation of an efficient market, is that trading behaviour differs markedly depending on water availability. In periods where there is an abundance of water, there is little incentive for non-consumptive water investors to be active in the market. Conversely, investor activity ramps up during drought periods.

Textbook markets characterised by many small buyers and sellers using the same information set and transacting continuously (i.e., there are no impediments to liquidity in the market) generate socially optimal outcomes over the longer term. In the context of water, this would result in water being efficiently allocated to its socially optimal use with all businesses earning a normal rate of return – that is a return that is sufficient to maintain equilibrium in the farm sector. This means there is no incentive for farmers to scale operations up or down or for businesses to enter or leave the industry. In the textbook market it is possible that in the short term, buyers and sellers make mistakes in trading decisions when they react to new information (e.g., predictions of long-term weather patterns). However, such mistakes cannot have significant impacts on the market as there are many players and mistakes will tend to cancel one another (e.g., some players will over-estimate and others under-estimate the impact of the new information). With liquid markets and many buyers and sellers, a new equilibrium will be reached without major distortions in the allocation of water.

The reality of the SMDB water market is very different to the textbook market.

- There are some large (and growing) buyers and sellers operating in the market.
- The supply side of the market is dominated by weather conditions. This can result in discontinuities when extreme weather conditions prevail (e.g., droughts and floods).
- Volumes traded can vary significantly depending on weather conditions with some market participants (e.g., some non-consumptive users) active only in drought conditions.
- Mistakes or misuse of market power can have damaging and lasting impacts on farmers and local communities.

None of the characteristics of the SMDB water market will necessarily prevent a socially optimal outcome from being achieved in the long run. However, it is critical to recognise that the long run in this context is likely to mean decades rather than months or even years. Major droughts that test the limits of the market occur only sporadically. This means that market participants may not have the benefit of learning from repeated trial-and-error participation in the market under different conditions with many small transactions (relative to the size of their business).

For example, a farmer might have only one or two opportunities to operate in a market impacted by a severe drought resulting in them having to make all-or-nothing decisions because the transaction size and value is likely to be very large relative to the size of their balance sheet. This means that the consequences of getting one transaction wrong (paying too much for water or not paying enough, resulting in not getting access to enough water) can be harmful to the farmer. In other markets, the transaction size relative to the balance sheet of the transactor are typically small and/or the nature of transactions differs. For example, large transactions can be planned and executed without the urgency that an extreme drought imposes on farmers who need water to keep their crops alive. It is important to recognise that the urgency a drought imposes on a farmer operating in the water market is not specific to that farmer. In such circumstances, all farmers operating in the water market are likely to be experiencing the same pressures. This can be likened to a banking crisis where a severe shock leads all participants to seek an exit from the market and selling activity leads to a downward spiral in asset prices and, potentially, systemic failure as contagion effects bring down businesses that are otherwise healthy. In the water market, the shock is a drought and all participants seek water at the same time leading to an upward spiral in prices and potential systemic failure in the farm sector and local communities.

Theoretically, in the very long run, with the accumulated experience of participating in the market over many weather cycles, the market may produce socially acceptable outcomes. In the shorter term, however, the structural adjustment costs⁵ for the farm sector and the local communities that depend on agriculture can be damaging. The collapse or near-collapse of farm operations can be stressful for farmers and can have adverse effects on the social and economic fabric of local communities that depend on farm activities.

In textbook markets, structural adjustment costs are externalities that are not taken into account by individual participants when making decisions. In these textbook markets the replacement of existing businesses with new businesses is assumed to happen in an orderly fashion, with each business that drops in or out of the market not being big enough to cause harm to other businesses or local economies. In the context of farm communities dealing with extreme drought conditions, the assumption of orderly transition is far from reality. Farm operations might be small on a national or global scale but in terms of the local economy they can be big enough to have a significant impact at the local level in terms of the income they generate directly and indirectly through their supply chains. Moreover, because an extreme drought is likely to affect all farm operations in a region, the negative impacts on the local economy will be leveraged. Such shocks lead to an abrupt rather than orderly transition of the local economy. In such circumstances, diversity and depth in the farm sector and the local economy may be lost as businesses and people are no longer willing to take the risks necessary to operate or work in businesses that can be badly impacted by extreme droughts.

Structural adjustment in the farm sector is inevitable and healthy for the economy over the longer term. In such a transition, there is an opportunity for existing businesses to restructure and prepare for changed opportunities as well as for new businesses to emerge to soak up valuable resources released by the businesses that are exiting the market. In a crisis environment, where an extreme drought impacts many businesses at the same time this type of orderly transition cannot happen. Instead, it is likely that there is a consolidation of activities by the strongest businesses in the local economy and a narrowing of the economic base. Governments can provide support to local communities impacted by shocks such as drought, to help offset the structural adjustment costs.

Cobram shared the view that the presence of non-consumptive users in the SMDB water market has the potential to seriously exacerbate the negative impacts on farms and farming communities of inevitable, but unpredictable shocks like extreme drought. Due to the particular characteristics of the SMDB water market Cobram is of the view, that the government needs to look more closely at the role non-consumptive users play in the market, particularly in drought periods. Providing relief to communities impacted by extreme drought conditions is welcome but ensuring that the negative impacts of such shocks on the community are not exacerbated by the behaviour of non-consumptive water traders should be a priority for government.

KPMG acknowledges this line of thinking and agrees that market power is one way that non-consumptive water traders can exacerbate the negative impacts of extreme drought conditions on farmers and local economies. Where investors to have market power in the water market, water prices would increase above fair value (i.e., what would be obtained in a competitive equilibrium). In this hypothetical scenario, non-consumptive water traders exert market power to earn above normal profits (i.e., what is required to fairly compensate them for the risk that they are taking) and farmers buying water for their crops will earn below normal profits (i.e., what is required to keep them in business). This would clearly not be a sustainable outcome and farmers would leave the industry voluntarily or involuntarily if they experienced financial stress.

However, KPMG also acknowledges that the ACCC found no evidence of market power being exerted in the SMDB entitlement or allocation water markets. As such, the hypothetical scenario discussed may not have played out since the market's inception. However, as discussed earlier we are not convinced that there is sufficient evidence to support a statistically robust conclusion that market power has not been exerted in the SMDB market. This is a technical issue about what has happened in history that can be debated by experts.

Cobram's main concern is forward looking and relates to the behaviour of institutional investors in the water market in future drought periods as they have been growing in size and influence since the last drought ended in 2020.

Although to date the ACCC found the size of investor holdings not to be of sufficient size to exert market power, the trends in the growth of investors warrants attention going forward, especially in the coming years where an El Niño has been declared, increasing the likelihood of dry conditions. Whether the size of holdings is sufficient to exert market power should be considered in the context of water availability, as low water availability in extreme drought conditions and growing investor activity in the water market are potentially problematic in future dry periods.

⁵ The costs that can be incurred when a structural change has an impact on an industry or community

As an example, the investment company Duxton Water reportedly bought 64.5GL of allocation water in 2018. The ACCC did not specifically draw attention to Duxton but noted that one large investor purchased a significant number of small parcels of water and sold the water back into the market at a later date in larger parcels. The ACCC analysis did not find any evidence that any investor, including Duxton, was able to exercise market power or withhold water to increase prices. While this example was assessed as not having distorted the market, it is possible that in future dry years investors, such as Duxton, may indeed be able to exert market power.

This potential for market distortion by non-consumptive investors is assessed below. KPMG considered two mechanisms that can lead to market distortion. The first relates to the size of the investor (and their associated allocation trades) relative to the market. The second relates to the potential for drought conditions to lead to speculative bubbles that increase allocation water prices well above fair value.

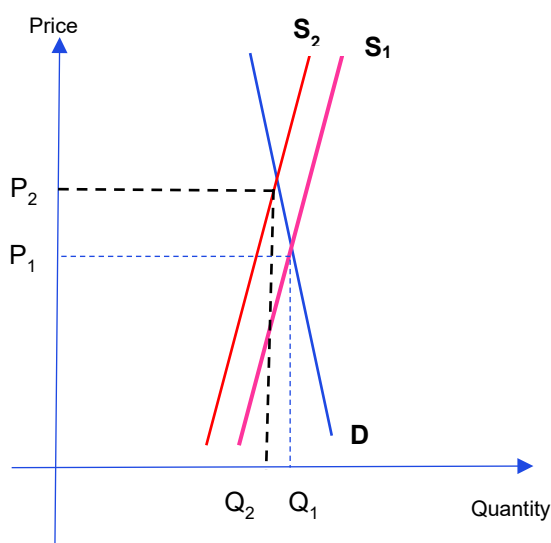
1. Market power based on size

Market power refers to the ability of a firm or a group of firms to influence the price of a good or service in the market. In the water market, participants do not have the ability to affect the overall supply of allocation water. In the allocation (temporary) market, it is the state water resource managers that make seasonal determinations against entitlement, and therefore dictate water availability at a point in time. Entitlement owners who attract this allocation water can choose when (and how much) of their supply is brought to market to trade. Entitlement owners and non-consumptive traders who buy and hold allocation water have the potential to exert market power if they hold significant volumes of allocation water. So, by holding large volumes of allocation water back from sale and/or by buying in the allocation market, investors may be able to use their size to put upward pressure on prices, thereby improving the value of their portfolio. As in other markets, there is a risk that investors with significant resources and market knowledge can influence prices through their trading activities.

Economic theory demonstrates that market distortions created by the exercise of market power (e.g., monopoly or monopsony) result in a deadweight loss to society. In this case, there would be a transfer of wealth from consumptive users to investors but net welfare for society would be lower than would have been obtained in the absence of market distortions (i.e., if the market had operated competitively). While allocation holders are not able to reduce supply, they can withhold supply for a time in anticipation of obtaining higher prices. In extreme drought conditions when demand for water is acute (and inelastic) large investors may have incentives to manipulate the price higher by withholding supply.

Figure 1 highlights the features of the water market in periods of drought that make it vulnerable to changes in supply, whether through misuse of market power or speculative investment behaviour aimed at generating large returns (this is discussed further in the next section in relation to carry-over provisions).

Figure 1: Supply and demand graphic in periods of drought



The diagram shows that in drought conditions both supply and demand are highly inelastic – water is essentially fixed in supply and farmers with perennial plantings need water to keep their crops alive. With inelastic supply and demand conditions, small changes in quantity supplied lead to disproportionately large price responses. As can be seen in Figure 1, withdrawing supply is represented by the shift of the supply curve to the left – this might reflect an investor carrying over a larger proportion of their water portfolio for the following season. This action reduces the quantity traded by a small amount but increases the price of water by a disproportionately large amount.

2. Speculative bubbles

A speculative bubble in the water market may occur when price is driven “irrationally” above its fair value (or competitive equilibrium price) as investors chasing high returns compete for scarce water without understanding its underlying value (to consumptive users). Such mistakes can occur in financial markets where the prices of financial assets (e.g., particular stocks) are driven above fair value. Such mis-pricings will typically be resolved without major disruption to the underlying businesses or the economy. In water markets, where users are concentrated in local economies and demand for water is highly inelastic in drought conditions, mistakes by investors (over-pricing water) can be devastating to the farm businesses whose key assets are perennial crops that are worthless without water. With perennial crops, not having access to water at critical points in time does not just result in crop loss for a particular season, it may result in the loss of all future crops that the perennial plantings were expected to support. Over-priced water may result in losses or low returns for investors, but it could also lead directly to farm businesses, the underlying users of water, going broke.

In financial markets, over-priced stocks (or other assets) typically result in investors losing money at some point when the price corrects to fair value. In water markets investors lose money as well, but along the way farmers who could not access water economically (because it was over-priced) go bust or lose part of their perennial crop. In an efficient market the fair value of water will reflect its scarcity value. As such, in drought periods the price of water will be high and will trade to its highest value use. In this process some farmers may not be able to buy the water that they need at a commercially viable price and this may result in them permanently losing some or all of their perennial plantings. This is an unavoidable part of operating farm businesses in locations where water availability is uncertain. KPMG acknowledges that these unavoidable risks can be exacerbated by investor activity during drought periods.

The risks to permanently losing plantings increases as the length of a drought increases. In a short drought, over-priced water may be sufficient to price-out annual crops, and perhaps some perennial plantings may be let go, but farm businesses facing these higher prices are likely to have the ability to recover the following

year. However, a drought extending multiple years with prices consistently above fair value is likely to have a more harmful impact on the longevity of agricultural operations and the local economies in which they operate. Such a scenario is likely to lead to bankruptcies and exits from the industry and the community.

Paradoxically, water carry over rules that were originally designed to allow farmers to hedge against drought, can provide non-consumptive users with leverage during severe drought conditions to increase their expected returns with minimal risk. For example, a managed water fund will have a risk-return target when it enters the market. If, during a drought, the fund can sell a proportion of its holdings (say 70%) and achieve its target return then the remainder of its water holdings can be carried over as a speculative investment that could be worth nothing in the future if the drought breaks or could be worth a lot more if the drought continues. The investment returns to the fund become skewed to the upside. For example, if the sale of 70% of the fund's holdings generated 20% return at the fund level (or about 29% on the 70% of water sold) then the worst that could happen to the fund if they make a mistake and cannot not sell the remainder of their holdings (i.e., the drought breaks and they let the water run out to sea) is to return 20% to their investors. On the other hand, if the drought continues the remaining tranche of their water holdings (i.e., 30%) will earn more than 29% return and the overall return to the fund will be greater than 29%. This skewed distribution of returns in drought conditions provides a strong incentive for non-consumptive investors to engage in highly speculative behaviour. While the negative consequence of this behaviour is relatively small for non-consumptive investors, the potential impact on farmers and local communities during droughts can be severe.

High-priced water during drought conditions can have adverse impacts on farm businesses and local economies. As such, getting a better understanding of what fair value is for water in drought conditions and what behaviour can drive prices above fair value should be a priority for government as the frequency and severity of droughts is likely to increase.

The ACCC observed that the size of investment funds in the SMDB water market is increasing as a result of the large returns generated in periods of drought. Over a long period of time, it is possible that the growing involvement of investors in the market will result in poor returns and the amount of capital invested in these funds will fall. If too much money is invested in water the price will be bid up above its fair (equilibrium) value. A possible analogy can be found in momentum trading strategies where a shock creates upward momentum in prices, which draws more money into the market, that pushes the price up further, creating a feedback loop. In the water market, equilibrium will be restored in one, or both, of the following ways – farmers go out of business so that the demand for water collapses or the drought breaks so supply increases. If the drought breaks before farms become distressed, then the consequences of such behaviour may not be so damaging (but may cause stress to farmers). However, if it takes some time for the drought to break, a prolonged period of water prices being above fair value will be damaging for the farm sector (e.g., forcing some businesses into bankruptcy, crop losses, reduced scale etc). This has the potential to have damaging impacts on the communities that serve these farms, which is addressed in the next section.

3. Socio-economic Impacts

Whether the distortion in the water market is caused by the deliberate misuse of market power by investors or simply the over-investment in water funds, the outcome will be very similar. In drought conditions, water prices will be above fair value and this will result in potentially devastating socio-economic consequences for local communities.

In times of drought, there has been a clear link demonstrated between irrigators poor mental health and financial hardship and water uncertainty (Wheeler et al. 2018⁶). These mental health impacts on irrigators and the associated consequences for their families and social environments will be exacerbated if abuse of market power and over-investment in water add to the financial hardships in future drought periods.

Over-priced water will reduce overall agricultural production and skew the mix of activities away from lower value crops toward higher value crops. The transition toward higher value uses may mean more efficient water use practices, lower labour requirements and higher export revenues, but this may come at the expense of regional economies and towns. Consolidation and concentration of farm activities reduces the depth and diversity of regional economies, which may lead to economic and social dislocation as businesses and people choose to leave the region. As noted earlier, the pace at which such structural change occurs is

⁶ Wheeler et al. (2018), *Water torture: Unravelling the psychological distress of irrigators in Australia*. Journal of Rural Studies, 62(183-194).

important. Structural adjustment costs will be high when the transition is abrupt and disorderly (e.g., financial stress in the farm sector and in the local economies that support the farm sector).

It should also be noted that diversity in the mix of annual and perennial farm activities is valuable, and this diversity is being eroded away. The demand elasticity for annual crops is low relative to perennial crops and the trend toward perennials will lead to a continuing hardening of demand (Loch et al. 2021⁷). Hardening of demand creates more certainty in water consumption, however it has negative consequences as the participants left in the market are more susceptible to the changes in supply, which is inevitable in a changing climate.

The change in land use from annual to perennial crops reduces the system's flexibility to respond to dry years and in particular, a sequence of dry years – therefore if water volume was to be held up by market participants with market power manipulating the market, this would have a more significant impact. This highlights the need for the government to ensure that the activities of investors in the water market do not create distortions that exacerbate the risk faced by farmers during droughts.

⁷ Loch et al. (2021), Markets, mis-direction and motives: A factual analysis of hoarding and speculation in southern Murray–Darling Basin water markets. *Agricultural and Resource Economics*, 65(291-317).

Conclusion

Cobram is concerned that non-consumptive water investors will distort the SMDB water market in drought periods. Such distortions would adversely impact farm businesses that are dependent on irrigation water and the local communities that are dependent on these farms.

KPMG analysis suggest that Cobram's concerns need to be taken seriously by government. The water market does not fit the mould of a text-book market or a conventional financial market: it is characterised by features that make it vulnerable to distortion, particularly in extreme drought conditions. Moreover, these distortions can potentially emerge from deliberate behaviour involving exertion of market power or from the incidental behaviour of speculators which results in an over-investment in water. KPMG's conclusion is that regulation of the water market must be sensitive to the particular characteristics of the market and that regulations designed for other markets, including financial markets, are unlikely to be adequate.

The reforms proposed by the ACCC are to be welcomed. However, it is not clear that these reforms will address the concerns raised by Cobram about the operation of the market in extreme drought conditions. KPMG's analysis suggests that Cobram's concerns are valid and warrant consideration by the government in the development of market reforms. The behaviour of the water market is very different in drought periods on both the supply side and demand side. Distortions in the water market, caused deliberately or inadvertently, during extreme drought conditions have the potential to be devastating and long lasting for farmers and their communities.

With the frequency and severity of droughts expected to increase over time there is an urgent need for the government to review the role of investors in the market specifically during drought periods. Consideration must be given to reforms that explicitly address the role and behaviour of investors during drought periods. Droughts create unavoidable risks that can test to the limit the resilience of farmers and farm communities. The regulatory and governance structures imposed on the water market should include explicit measures and processes to ensure that the unavoidable risks of droughts are not exacerbated by investor activity.

Appendix

Case Study: California Assembly Bill 1205

Summary:

- The agricultural sector accounts for approximately 80% of water use in California. In the past decade, California has seen growth in perennial tree and vine crops which need to be watered each year. The reliance on these types of agricultural products makes Californian farms more vulnerable to water shortages, as these crops have largely inelastic demand for water.
- California law says that water can be diverted from a specified source if put to beneficial and non-wasteful use. As such, water rights can be acquired by demonstrating the user is extracting the water and using it for a beneficial purpose. 'Beneficial use' is not restricted to agriculture, but includes many other diverse uses of water (e.g. industrial, heat control, municipal etc).
- California recognises several different types of rights to take and use surface water. For the purposes of this summary, only appropriative water rights will be considered as that is the type of right most relevant to the Australian context.
- In California's water market, buyers and sellers trade water through short- and long-term leases as well as by permanent sales of their water rights. On average, about 4% of all agricultural or urban water is traded annually. Although some sellers trade water they have stored in reservoirs or underground, water usually becomes available for trading when sellers forego their own use. Buyers generally make financial payments to sellers, but they sometimes also repay in water at a later date.
- Institutional investors have become increasingly involved in the Californian water markets in recent years. It should be noted that 'investors' as they are termed in the local discourse in California are not the same as investors are considered in the Australian markets. Investors in California operate differently to investors in Australian water markets, as they are not investing in the water rights alone. Typically, they purchase farmland with established water rights and then trade the water rights to the best and highest consumptive beneficial use. The water can be sold for urban uses, or for higher-value agricultural use. That is trading by 'investors' as it is described in California includes a vegetable grower trading water to a higher value (but still productive) use such as growing almonds. The restriction for investors in California is that they must buy the associated land to obtain the water rights, that is, they must buy the entire 'beneficial purpose' use of the water. Then, once they have the water right along with the land, they can trade the water separately to another 'beneficial use' of the water. The equivalent of participating in the Australian temporary market does not exist in the Californian water market - the closest example is a short-term lease.
- Despite this restriction on traders of water in California, this market has also seen its share of stress in drought times of recent years. In May 2023, California lawmakers passed a bill that would prohibit institutional investors from trading agricultural water resources for financial gain. The Bill provides that speculation or profiteering by investment funds in the sale, transfer or lease of water rights on agricultural land would be considered an unreasonable use of water. The Bill declares that "speculation or profiteering by an investment fund in the sale, transfer, or lease of any surface or groundwater right previously put to use on agricultural lands within the state shall be considered an unreasonable use of water."
- The Bill's author, Bauer-Kahan (representing an urban district) maintains that the practice of institutional investors buying agricultural land to access associated overlying and appropriative groundwater rights and appropriative surface water rights is not in the public interest and is unconscionable in an era of increasing water scarcity due to drought and climate change.
- However, peak agricultural bodies are opposed to the bill, saying it would "prohibit a potential solution afforded by private capital invested in developing reliable supplies" and that transfers involving private investment funds "have become a normal part of modern operations for California agriculture." The agricultural groups also submitted that the Bill would "make it harder to move water from unproductive farmland to more productive farming or urban uses." Further, the agricultural groups noted that "a water transfer is not in and of itself a beneficial use of water and that, instead, it is the recipient of the transferred water who puts it to beneficial use thus making the consequences of this bill unclear." Further, they note that there is no evidence that investors are manipulating the market.
- It is hard to draw strong conclusions from the Californian water market Case Study. The Californian market is very different to the SMDB market yet both markets become stressed during drought periods and impacted communities

are dissatisfied with the outcomes. In California non-consumptive investors cannot participate in the water market and reforms have been introduced to further restrict trading, effectively preventing trades that are common in Australia between consumptive users. Trades between consumptive users in the SMDB are seen as an important mechanism for ensuring that water is allocated to its highest value use.

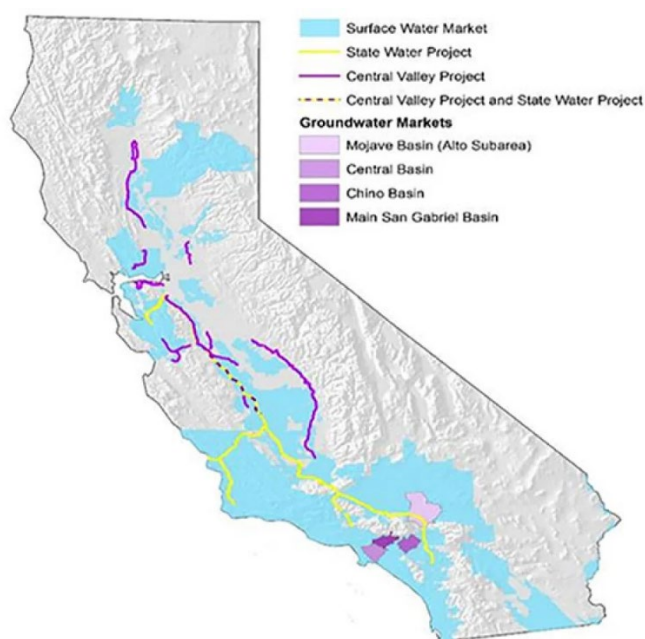
Water use in California

The agricultural sector accounts for approximately 80% of water use in California.⁸ There are approximately 9 million acres of irrigated farmland in California, and that acreage requires 24.5 million acre feet of water. Most agricultural water use occurs from June through September. In the past decade, California has seen growth in perennial tree and vine crops which need to be watered each year. The reliance on these types of agricultural products makes California farms more vulnerable to any water shortages.

Water rights in California

California law distinguishes between surface water and groundwater. Groundwater rights can be acquired by extracting the water and using it for a beneficial purpose, subject to an exception which applies to “subterranean streams flowing in known and definite channels,” for which a permit is required. A groundwater right can be either an “appropriative” or an “overlying” right. Overlying groundwater rights have higher priority over appropriative groundwater rights in times of shortage. The State Water Board does not have authority to issue permits for groundwater diversions, except for diversions from subterranean streams. However, the state does have the authority to take action to stop wasteful or unreasonable uses of groundwater or to stop groundwater diversions that harm state resources.

Figure 1: Surface water and groundwater distribution in California



California recognizes several different types of rights to take and use surface water. Pueblo rights and federal reserved rights can only be held by governments. Individuals can hold riparian water rights, appropriative rights, and prescriptive water rights.

- Riparian water:** A riparian water right is a right to use the natural flow of water on riparian land. Riparian land is the smallest parcel of land contiguous to a natural water source, in a single chain of title from the original private owner, that is within the watershed of the stream, lake, river, or creek. Public land does not have riparian rights. Water obtained through a riparian right must be used on the parcel of riparian land connected to the riparian right – riparian rights that attach to a small parcel cannot be used on adjacent parcels. The right arises by virtue of ownership of the riparian land and is not gained by use nor lost by non-use. Riparian water rights cannot be sold or transferred other than with the riparian land. Riparian rights come with owning a parcel of riparian land that is adjacent to a source of water, and the rights remain with the parcel when it changes hands. However, a riparian right can be lost even if land is not cut off from the water source. This can happen when the owner of the riparian land sells or transfers the land to someone but separates the riparian right from the parcel. The verification of riparian rights requires a careful examination of the chain of title back to the original land grant, together with a detailed examination of each deed in the chain to determine if riparian rights were reserved to an otherwise severed parcel or conveyed from an otherwise riparian parcel. Once it is lost, a riparian right can be restored only under exceptional circumstances. If riparian land is

⁸ [Agricultural Water Use Efficiency \(ca.gov\)](https://www.ca.gov)

subdivided so that some parts of the land do not touch the water, those lands will lose their riparian rights unless steps are taken to preserve them when the subdivision occurs, although this is uncommon. Only the natural flow of water can be diverted under a riparian right. Water that is imported into a watershed from another river, stream, or creek cannot be used under a riparian right. Water cannot be stored during a wet time for use during a drier time under a riparian right, neither can water released from an upstream storage reservoir be used by a downstream user under a riparian right. Because a riparian right only allows the use of natural flow, it is possible to have water available under a riparian right during wetter periods and not during drier periods. Riparian right holders on a stream course all have the same priority, but riparian rights have priority over appropriative rights. However, recent California court decisions suggest that unexercised riparian rights can be subordinated to longstanding downstream appropriative rights in order to avoid unfair disruption of water allocation schemes upon which water users have come to rely.

- **Appropriative:** Someone who takes water for use on non-riparian land or who uses water that would not be there under natural conditions on riparian land appropriates water. Water right permits and licenses issued by the State Water Board and its predecessors are appropriative water rights. Appropriative rights are governed by the 'first in time, first in right' maxim. Thus, 'senior' (earlier) appropriators have priority to 'junior' (later) appropriators of water. Appropriated water may be stored for later use or held for diversion and beneficial use.
- **Prescriptive:** A prescriptive right is a right that is acquired through adverse possession of someone else's water right. Prescriptive rights are difficult to obtain and can only be granted by a court. Most people in California do not have and cannot acquire a prescriptive right. The courts have clarified that since 1914, the only way to acquire a new water right is to apply for and receive a water right permit from the State Water Board.

Water right permits and water right licences

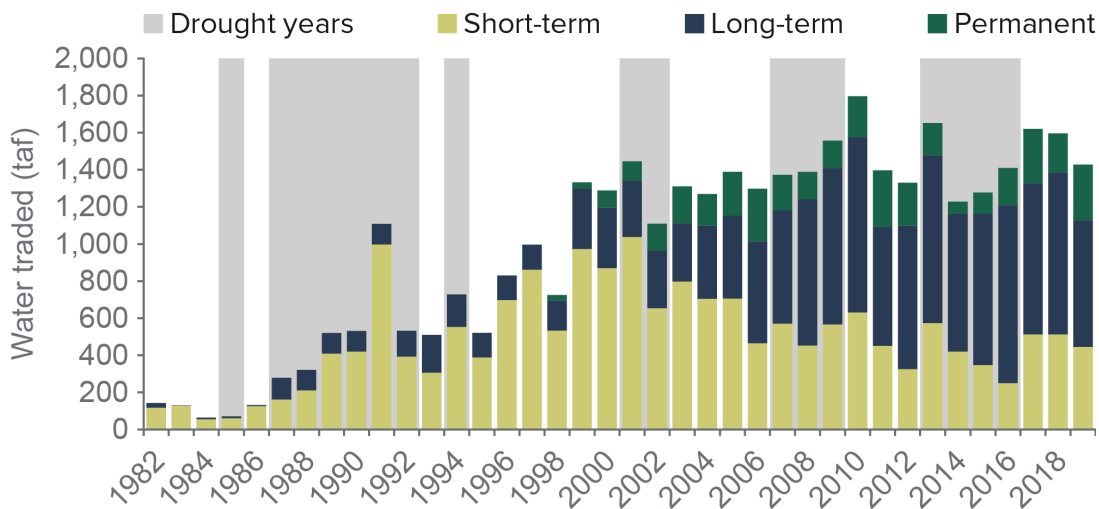
If a water user began using surface water or groundwater from a subterranean stream after 1914, when the *State Water Commission Act* was enacted, unless they have a riparian right they must apply for and receive a water right permit from the State Water Board before using water. The permit will allow development of the water supply project and to take and use water. After the project has been developed and the water has been used, the State Water Board will determine how much water was beneficially used and will issue a water right license. A licence will be received for only that water that has been reasonably and beneficially used.

Water trading in California

In California's water market, buyers and sellers trade water through short- and long-term leases as well as by permanent sales of their water rights. Roughly 1.5 million acre-feet of water is traded annually in California, about 4% of all agricultural and urban water. Most trading occurs within the same county (46%) or region (26%). The market took off during the 1987–92 drought, spurred in part by a state-run Drought Water Bank. Volumes traded have been fairly flat since the early 2000s, though there has been a shift toward more long-term leasing and permanent sales.⁹ This reflects a complex approval process involving federal, state, and local restrictions. The transfer approval process is fragmented and inconsistent, with different rules for different types of water rights and agencies. Groundwater markets have been slow to develop because tradable rights to pump are still rare.

⁹ [California's Water Market - Public Policy Institute of California \(ppic.org\)](https://ppic.org/publications/california-water-market/)

Figure 2: California's surface water trades have been fairly flat since the early 2000s



Source: Sencan and Hanak, [California's Water Market, By the Numbers: Update 2021](#) (PPIC, 2021).

Notes: The figure shows surface water traded between entities that are not members of the same water district or wholesale agency. It excludes volumes committed under long-term lease and permanent-sale contracts that were not physically transferred because of hydrologic conditions or other factors (in 2019, roughly 800,000 acre-feet). Drought years are those classified as dry or critically dry for the Sacramento Valley. Although 2016 was a below-normal year, it is also shown as a drought year because it came on the heels of multiple dry years. Volumes are in thousands of acre-feet (taf).

Although some sellers trade water they have stored in reservoirs or underground, water usually becomes available for trading when sellers forego their own use. Buyers generally make financial payments to sellers, but they sometimes also repay in water at a later date. There are three main types of water transfers in California – surface water transfer, groundwater substitution transfer, and groundwater transfer.

- **Surface water transfers:** Sellers make water available by reducing their own diversions from reservoirs, rivers, lakes, and streams so that buyers can increase their diversions elsewhere in the system. Buyers may be nearby, or at some distance; what is key is having the ability to transfer water from sellers to buyers, through water conveyance infrastructure (rivers, canals, pipelines).
- **Groundwater substitution transfers:** These transactions involve both surface water and groundwater; water users sell their surface water, but instead of cutting back their demand, they pump additional groundwater for their own use.
- **Groundwater transfers:** Sellers reduce their groundwater pumping, and buyers increase pumping elsewhere. These trades typically occur within the same groundwater basin. In contrast to surface water trades, these transactions do not require physically moving water between sellers and buyers, as long as there is a close hydrologic connection between the pumping locations of the parties—but they do require a robust accounting system to ensure parties pump and trade only their own water.¹⁰

Role of Investors

For the most part institutional investors operate in two ways within the Californian water market.

- Firstly, they own and operate farms that tend to grow high-value permanent crops (such as nuts, olives etc). These activities have led to depletion of groundwater in California, leaving less drinking water for surrounding communities.¹¹ Note: this is a different definition of how 'investors' are considered in Australia.
- Secondly, institutional investors are also known to buy plots of land to own the water rights. The investors then lease this water to the highest and best use. This can include agricultural, industrial or urban.¹² Note: this more closely aligns to the definition of how 'investors' are considered in Australia.

¹⁰ [Improving California's Water Market - Public Policy Institute of California \(ppic.org\)](#)

¹¹ Banks, pension funds and insurers have been turning California's scare water into enormous profits, leaving people with less to drink. Waldman et al. (2023). Published by Bloomberg Green series.

¹² Wall Street is thirsty for its next big investment opportunity: The West's vanishing water. Published by CNN. Retrieved from; [Wall Street investment firms are thirsty for the West's vanishing water | CNN Business](#)

It is noted in both cases, the purchase of the water rights cannot be obtained without buying the property associated with that water right along with its existing use activities (i.e. buying up whole farms). The ‘investors’ are not able to simply buy the water rights on their own.

Recent developments in California:

In May 2023, California lawmakers passed a bill that would prohibit institutional investors from trading agricultural water resources for financial gain. The Bill provides that speculation or profiteering by investment funds in the sale, transfer or lease of water rights on agricultural land would be considered a waste or unreasonable use of water. The measure passed the State Assembly 46-17 and is currently before the Senate.

The Bill declares that “speculation or profiteering by an investment fund in the sale, transfer, or lease of any surface or groundwater right previously put to use on agricultural lands within the state shall be considered a waste or unreasonable use of water within the meaning Section 2 of Article X of the California Constitution.” This would cover surface water transfers, groundwater substitution transfers, and groundwater transfers.

The California Constitution provides that any water granted to rights-holders must be put to ‘beneficial use,’ but not necessarily agricultural. Categories of beneficial uses recognized in California include aquaculture, domestic, fire protection, fish and wildlife, frost protection, heat control, industrial use, mining, municipal, power, recreation, stockwatering, and water quality control. The beneficial status of each of these uses has undergone evaluation to ensure that scarce water resources serves the highest needs.

The Bill’s author, Bauer-Kahan, maintains that the practice of institutional investors buying agricultural land to access associated overlying and appropriative groundwater rights and appropriative surface water rights is not in the public interest and is unconscionable in an era of increasing water scarcity due to drought and climate change. Bauer-Kahan argues that “California’s water resources are owned by the public and profiteering off of this precious resource cannot be tolerated when many of our communities and family farmers are having to cut back.”

However, peak agricultural bodies¹³ opposed the bill, saying it would “prohibit a potential solution afforded by private capital invested in developing reliable supplies” and that transfers involving private investment funds “have become a normal part of modern operations for California agriculture.” The agricultural groups also submitted that the Bill would “make it harder to move water from unproductive farmland to more productive farming or urban uses.” Further, the agricultural groups noted that “a water transfer is not in and of itself a beneficial use of water and that, instead, it is the recipient of the transferred water who puts it to beneficial use thus making the consequences of this bill unclear.”

The coalition of peak agricultural bodies submitted that “there is no evidence that private investment in water rights has caused market manipulation or any other harm.” They submitted:

“Recent data aggregations on sales and transfers of water show that the typical seller/transferor of water is an agricultural water user. The main beneficiaries or purchasers of such water are environmental, other agricultural, and municipal users. This data, though reflected in terms of water user rather than how a seller or buyer is organized, demonstrates that dry years and drought conditions drive demand and prices for water. This aggregated data did not indicate that market manipulation is occurring even in critical drought years.”

The California Chamber of Commerce, in opposing the bill, wrote that “studies of markets in Australia have indicated investor participation did not lead to negative impacts on agriculture or water users. More study of a perceived issue with water markets would be prudent.”¹⁴ The coalition of agricultural bodies submitted that these studies revealed that “investment fund participation in water markets did not increase water prices or manipulate the market.”¹⁵

Conclusion: relevance to the Southern Murray Darling Basin water market

Despite the absence of non-consumptive institutional investors in the Californian water markets, reforms are underway to reduce the role of investors in that market. Investors in the Californian market are considered to be parties that are changing water use from one activity to a different activity for the purpose of increasing profit. This is standard activity in the SMDB water market, although it is executed by businesses whose

¹³ Registered opposition: California Apple Commission, California Blueberry Association, California Blueberry Commission, California Building Industry Association, California Chamber of Commerce, California Cotton Ginners & Growers Association, California Farm Bureau Federation, California Fresh Fruit Association, Nisei Farmers League, Olive Growers Council of California, Plant California Alliance, Western Agricultural Processors Association, Western Growers Association.

¹⁴ [Bills Threaten to Destabilize State’s Water Rights System - CalChamber Alert](#)

¹⁵ [69447cfb-a157-41f1-96cb-44b5f9d601d5 \(windows.net\)](#)

primary activity is farming, rather than institutional investors buying and selling farm operations with attached water rights. The equivalent of a temporary market does not exist in the Californian water market.

Stresses in the Californian water market during drought periods have led to the reforms passed by the State Assembly in 2023 aimed at prohibiting institutional investors from trading agricultural water resources for financial gain. How this will work in practice remains to be seen but it is interesting to note that these reforms have been opposed by a coalition of peak agriculture bodies, who point to the Australian water markets as a model for allocating water to its most productive use.

Water is an essential resource that is scarce. This scarcity becomes extreme in drought conditions and is expected to become scarcer over time due to climate change. The fact that two very different water trading models, the one operating in California and the one operating in the SMDB, got stressed in drought conditions is telling. The intrinsic characteristics of water as an essential resource that becomes extremely scarce in drought conditions means that a free market is unlikely to result in an allocation of water that is optimal from a societal perspective. Some form of regulation is needed to help this market function efficiently in all conditions, including extreme drought conditions. However, as indicated in the body of this report, governments should consider reforms to the regulatory structure of the market to account for the special features of the water market, particularly during extreme drought conditions. Such reforms might focus on ensuring that the behaviour of investors during such periods does not impose unnecessary costs on local communities and society as a whole.

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