Peel – Namoi inter-valley trade

REVIEW REPORT

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Executive Summary

This review has been commissioned by the NSW Department of Planning Industry and Environment's Water division (DPIE Water) in response to findings by the NSW Natural Resources Commission's 10 year review[1] of the water sharing plan for the Peel regulated river water source (the NRC review). This review considers the issues associated with permanent and temporary trade between the Peel and Lower Namoi regulated water sources, and advises on options for such trade.

There is an active temporary and permanent trade market within each valley and, since 2010, the water sharing plans for the Peel and Lower Namoi regulated river water sources have allowed general security shares to be cancelled in the Peel and a reduced number of shares to be created in the Lower Namoi, based on a conversion factor. However, water is only supplied from Chaffey Dam, and accounted as a use of water in the Peel regulated river system, for any traded shares above a threshold of 7,500 shares up to a limit of 15,000 shares. Temporary inter-valley was trialled from 2014/15 to 2018/19, and used the same framework as the existing permanent inter-valley trade, with the traded account water subject to a conversion factor of 1.

However, there have only been three permanent intervalley trades in 11 years, and only 5 temporary trades in the five years of the temporary trade trial.

The Peel regulated system is in an unusual situation, with a relatively small volume of entitlement, and very low water use[2] and plan limit compared to that entitlement. Even a small amount of activation of under-utilised licences through trade or within the valley could require a significant reduction in the maximum general security allocation to bring water use back within the water use limit. The Peel regulated system also has the issue of high operating costs compared to the small cost base, and water use charges are among the highest in the NSW Murray-Darling basin.

These existing trade arrangements are not typical of inter-valley trade regimes elsewhere and provide significant protection against many of the issues faced by the Peel general security water users. This protection comes at the cost of relatively small reliability impacts to the Lower Namoi general security water users, and potentially impacts to supplementary access licence holders if the water use limit for Lower Namoi regulated system is exceeded.

In preparing advice, DPIE Water requires this review to take into account a range of issues, including:

- feedback from stakeholders
- Water availability and impacts
- Impact on water charges
- Potential for impact on LTAAEL, SDL
- Consideration of sleeper licences

[1]NSW Natural Resources Commission, Review of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010. Final report, May 2020.

[2] The total long-term average irrigation water use in the Peel Valley is approximately 7 GL/year.

- Social and economic impact
- Demand for trade
- Feasibility / practicality of implementation: administration and operation

The existing inter-water source trade, a tagged trade option, and a no trade option have been assessed against these criteria.

The existing arrangements provide a reasonable balance between tolerable impacts for both valleys, and there is no other trade arrangement that clearly provides a better outcome when all of the issues that form the terms of reference for this review are taken into account.

The very low level of observed permanent and temporary inter-valley trade is also significant. Whilst the precise drivers for this are unclear, the lack of trade means that there is little economic benefit arising from developing and maintaining the inter-valley trade provisions. Further consideration should be given to whether the administrative and operational costs outweigh the overall economic benefits of inter-valley trade, and whether NSW should take a similar approach to that for inter-state trade in the intersecting streams by restricting trade altogether

Purpose and scope of this review

This review has been commissioned by the NSW Department of Planning Industry and Environment's Water division (DPIE Water) in response to findings by the NSW Natural Resources Commission's 10 year review[3] of the water sharing plan for the Peel regulated river water source (the NRC review).

This review has been asked to consider the issues associated with permanent and temporary trade between the Peel and Lower Namoi regulated water sources, and to advise on options for such trade.

However, this review excludes consideration of trade within each regulated water source, trade between the Upper Namoi and Lower Namoi regulated water sources, and trade between regulated and unregulated water sources.

In preparing advice, DPIE Water requires this review to take into account a range of issues, including:

- feedback from stakeholders
- Water availability and impacts
- Impact on water charges
- Potential for impact on LTAAEL, SDL
- Consideration of sleeper licences
- Social and economic impact
- Demand for trade
- Feasibility / practicality of implementation: administration and operation

Introduction

Trade of water entitlements and allocations of water made to licences via Available Water Determinations (AWDs) has increased across the NSW Murray-Darling Basin since 1980s when licences in regulated river systems were converted from area-based to volumetric licences. There are now active trade markets in all of the inland regulated river systems, and between systems in the connected southern basin. The Peel and Namoi valleys have active water trade markets within their respective systems, but there has only been limited volumes of trade between these two hydrologically connected regulated river systems since the introduction of inter-valley trade in water access licence shares (permanent trade) and the trial of inter-valley trade in water access licence account water (temporary or allocation trade).

Trade in water entitlements and allocated water as a mechanism to allow water to move to its highest value use has been a collective policy objective of state and federal governments

[3]NSW Natural Resources Commission, Review of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010. Final report, May 2020.

for many decades. This policy objective has been formalised as part of the 1994 Council of Australian Governments agreement, and the 2004 National Water Initiative, and has been given effect through state and federal legislation. The Basin Plan builds on the National Water Initiative and prescribes requirements for trade within and between regulated river systems to be free, subject only to the permitted limitations described in chapter 12.

However, water trade can result in physical impacts on the river systems used to supply water, and can have economic and social impacts to individuals and communities. Moving the use of water to different locations can have physical implications such as changes in the river transmission losses that occur, changes in flow rates in sections of rivers where the river has channel capacity constraints, and changes in the timing of water demands and therefore the timing of river flows. Likewise, moving the use of water to different locations can also result in economic and social benefits or impacts to supporting industries and local communities.

The introduction of inter-valley trade across southern connected basin was introduced in a precautionary manner, with trials based on limited volumes of trade and review mechanisms that allowed trade arrangements to be altered or restricted if impacts became evident.

Namoi and Peel regulated systems

Overview

The Lower Namoi and Peel regulated systems are directly hydrologically connected, with the Peel River flowing into the Namoi River a short distance downstream of the main storage on the Namoi River at Keepit Dam (Figure 1).

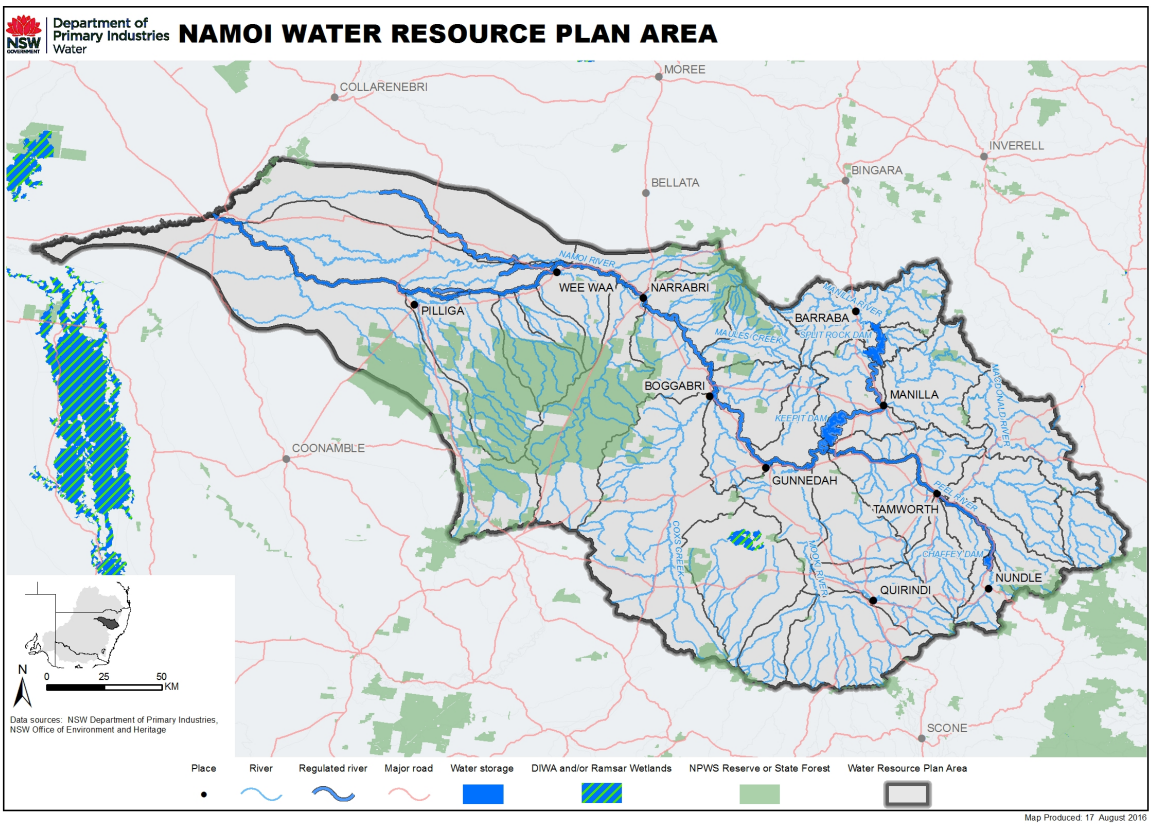


Figure 1: Namoi and Peel regulated systems

The relative storage capacities, licensed entitlements, and modelled long-term average use in each valley is described in Table 1, which shows that the Lower Namoi regulated river system is very much larger than the Peel regulated system in all respects. Importantly, in the Peel Valley, the amount of licensed entitlement is much higher than the Plan Limit, as there is a significant number of licences that have not been used to date.

Table 1: Comparison of Lower Namoi and Peel regulated systems

	Lower Namoi	Peel
Major dam storage capacity (megalitres)	425,500 (Keepit Dam) 397,370 (Split Rock Dam)	100,500 (Chaffey Dam)
Licensed entitlement (shares)[1]		
High priority[2]	8,173	17,367
General security	245,237	29,311
Supplementary	115,479	0
TOTAL	368,889	46,678
Modelled long-term average use (megalitres/year)[3,4]		
High priority[2]	3,400	8, 850
General security	151,000[5]	7,100
Supplementary	59,500	0
TOTAL	231,400	15,900
Water use limit (megalitres/year)	255,700	16,100

[1]NSW Water register (June 2021)

[2]Includes Local water utility (16,400 shares), domestic and stock (163 shares), and high security (804 shares)

[3]Namoi Water Resource Plan – Namoi Pre basin plan (PBP) scenario model – Namoi Regulated River System (Appendix B to Schedule F)

[4]Namoi Water Resource Plan – Pre basin plan Scenario Report – Peel regulated system (Appendix D to Schedule F)

[5]Includes 8,200 ML/year of use attributed to held environmental water (licences recovered for environmental use under the Basin Plan)

Trade Rules

Permanent Inter-valley trade

The water sharing plans for the Peel and Lower Namoi regulated river water sources allow general security shares to be cancelled in the Peel and a reduced number of shares to be created in the Lower Namoi, based on a conversion factor. The conversion factor was initially set at 0.4 in 2010. However, the conversion factor was increased to 0.5 in 2019 to be consistent with the level of transmission losses incurred delivering water from Chaffey Dam to water users in the Lower Namoi.

A limit has been placed on the permanent inter-valley trade of 15,000 shares traded out of the Peel regulated system (and therefore 7,500 shares into the Lower Namoi). The first 3,750 licence shares created in the Lower Namoi under the inter-valley trade arrangements are to be supplied from Keepit Dam, and that use accounted against the Lower Namoi water use limit. If permanent inter-valley trade exceeds this threshold, an inter-valley transfer

account is to be established in the Peel Valley, and the allocations to any shares that are subsequently traded (after applying the conversion factor) are to be credited to this account, and supplied from Chaffey Dam. The supply of that water is accounted as a use of water against the water use limit for the Peel regulated water source.

The inter-valley transfer account is credited with the general security allocations multiplied by the conversion factor, multiplied by the number of shares traded out of the Peel regulated river water source above the threshold for establishing the account. Once established, the inter-valley transfer account can then be called on by river operators to supply the water in the account as needed to the Lower Namoi regulated river system.

Temporary inter-valley trade

The trial of temporary inter-valley trade used the same framework as the existing permanent inter-valley trade, with the traded account water subject to a conversion factor of 1, and the resulting traded account water multiplied by the conversion factor adding to the same inter-valley trade account (if established).

The sum of the permanent trade and temporary trade was also limited to the original upper limit to permanent intervalley trade (15,000 shares plus megalitres). This was achieved by limiting the inter-valley trade account to the maximum number of shares traded above the initial 7,500 share threshold multiplied by the conversion factor. This was the 15,000 share limit on trade out of the Peel regulated system, less the 7,500 share threshold for establishing the IVT account, multiplied by the conversion factor of 0.4 (during the trial period), which equalled 3,000 ML.

Trade history

There is an active temporary and permanent trade market within each valley, and the annual trade history for the Peel and the Lower Namoi regulated river systems is shown in Attachment 1.

Permanent inter-valley trade was introduced with the commencement of the water sharing plan covering the Peel regulated system in 2010. Temporary inter-valley trade was introduced initially as a one year trial commencing in 2014/15, but continued for 5 years until the water sharing plans were replaced at the commencement of the 2019/20 water year. However, there has been very little permanent or temporary trade that has occurred.

Only three permanent inter-valley trades have occurred from the Peel regulated system to the Lower Namoi regulated river system: one trade in 2011 (350 shares), one trade in 2012 (100 shares), and 1 trade in 2017/18 (793 shares).

The temporary inter-valley trade trial from 2014/15 to 2018/19 extended beyond the one year trial, as there was no end clause included in the Peel water sharing plan with the temporary trade provisions, and changes to the water sharing plan were delayed until the plan replacements in 2019 as part of the implementation of the Basin Plan. Despite this extended trial period, only five temporary intervalley trades occurred during trial, with a total volume sold of 3,952 ML.

A conversion factor of 0.7 was intended to be used on the basis that this better represents the incremental increase in transmission losses. However, a conversion factor of 1 applied due to a water sharing plan drafting error.

As a result, trade in shares and allocations never reached the threshold for commencement of the inter-valley trade account, and the IVT account and associated administration have not yet been established.

Issues to be considered

Reliability impacts to other water users

Trade of water has the potential to result in impacts to water availability for other licence holders or the environment by changing the location and timing in which water is delivered. These are referred to as reliability impacts, and include impacts that can occur through increased transmission losses, or increases in water supply obligations without accompanying increases in water availability within a receiving water source.

Inter-valley trade will always have an impact where there is a net trade from the upstream valley to the downstream valley as there will always be a finite increase in transmission losses. However, in the southern connected basin, inter-valley trade arrangements were accepted on the basis that these impacts were marginal and the benefits from increases in the value of water licences and account water through trade would outweigh this. In the northern basin, transmission losses can be more significant in drier periods and the existing arrangements use a conversion factor for Peel to Lower Namoi trade to reduce this impact.

Increases in the utilisation of licences as a result of trade are often cited as an impact to other water users, as these licences now use more water, and there is less available for other licences. Whilst increases in utilisation of licences via trade or any other factor has an effect on other licences, the water management framework in NSW allows individuals to use water, or not, as a fundamental right of each licence holder, including through trade. The changes in water availability for other licences over time that arise from this are normally considered to be impacts that must be borne by licence holders. The Basin Plan also takes the same approach, and requires that Water Resource Plans allow trade free of restriction based on historical use, or anticipated increase in use[4].

Some approaches to inter-valley trade can result in volumes of water being held in the selling valley (e.g. in an inter-valley trade account), awaiting delivery to the buying valley, but no longer associated with a licence in the selling valley. When the storage in that selling valley fills and spills, the presence of undelivered traded water in the selling valley can occupy storage capacity that would otherwise fill with inflows and impact on water availability to other licences. Normally, river operators seek to use traded water from the selling valley as a priority to avoid this circumstance. However, large volumes of traded water can be difficult to deliver in wet periods or for other operational reasons. For these

[4]Basin Plan, clause 12.14.

reasons, valley limits to the net volume of water traded have been put in place where necessary in the southern connected basin.

Managing to water use limits

As noted in the previous section, trade can enable increases in the utilisation of licences where there are other factors that would otherwise constrain use. The level of utilisation of an individual licence is permitted to vary as a fundamental right of the licence. The valley water use limits imposed by water sharing plans[5] require that, where necessary to keep total diversions within the use limits, reductions in maximum AWDs be imposed at the licence category level starting with the lowest priority category of licence[6].

Where there are significant levels of underuse of licences, and the use limit is well below the sum of licence shares, there is greater potential for growth in water use above the valley use limit. In addition, significant levels of underuse of licences can magnify any reductions required to keep use within the limits, and modelling indicates that a small reduction in water use may require a large reduction in the maximum AWDs. This is a well-recognised issue for the Peel Valley, where utilisation of general security licences have remained at relatively low levels, and the level of licensed entitlements is well above the valley use limit (

[5] The Long Term Average Annual Extraction Limit (LTAAEL) and now also the Sustainable Diversion Limit (SDL).

[6] The lowest priority category of licence in the Lower Namoi is supplementary access, and in the Peel it is general security (there are no supplementary access licences in the Peel regulated system).

Table 1).

However, it should be noted that the valley-scale hydrologic modelling[7] aggregates water users into river reaches, representing them as one large water user. Where there are significant proportions of the aggregated waters with under-utilised licences, this approach tends to result in the model being insensitive to changes in general security AWDs, as each aggregated water user in the model has more entitlements than is required to irrigate each year. If growth in water use were to occur in the Peel regulated water source, any consequent action to reduce maximum general security AWDs would potentially need to make a significant reduction to achieve the required reduction in water use that would severely impact the more highly utilised licences.

The National Water Initiative and (particularly) the Basin Plan do not recognise the potential for impacts from increased utilisation of licences (such as reductions in maximum AWDs to manage water use within valley use limits) as grounds for restrictions to trade.

Impacts on water charges

It is recognised that high water prices have historically been a significant issue for Peel Valley water users, and that they were the primary driver for the introduction of the inter-valley temporary trade trial in 2014.

The Peel Valley has a relatively small amount of licensed entitlement and water use upon which to base water charges (the cost base) for the cost of maintaining and operating Chaffey Dam and regulated river operations. The water charges for general security licences in the Peel Valley are currently at similar levels to the Namoi Valley, although the water charges in both valleys are among the highest of the NSW valleys within the Murray-Darling basin. It is noted that IPART have continued to apply valley-based pricing in the draft WAMC determination and the WNSW determination.

Intervalley-trade can affect the cost base in the Peel regulated system. The maximum number of shares that could be cancelled in the Peel under current inter-valley trade arrangements is 15,000, which equates to approximately 31% of the total number of shares in the valley. If this level of trade were to occur, it would significantly reduce the number of licences in the Peel Valley compared to current levels, and there would be fewer licences to support the costs of managing and maintaining the regulated river system. Under such circumstances, there would likely need to be a significant increase in water charges in the Peel Valley to maintain cost recovery.

For the Namoi Valley, the number of shares that could be created under current trade arrangements is relatively small compared to the existing number of shares, and would result in a very small increase in the cost base and corresponding reduction in water charges.

Demand for trade

Both the Lower Namoi and the Peel regulated systems have a functioning trade market, and the history of permanent and temporary trading in each system is shown at Attachment 1 – Trade data. This data indicates that entitlement trade in both valleys is generally less than 1,000 shares/year in the Peel, and less than 2,000 shares/year in the Lower Namoi, and both

[7] The existing Integrated Quantity Quality Model (IQQM) and the new Source model.

can have years without any trade, which suggests that high levels of permanent inter-valley trade is unlikely. The local temporary trade market in each system has higher volumes of trade each year.

However, trade data shows that there has been little take up of either the permanent or temporary inter-valley trade facility to date.

The NRC review includes a quote from the Peel Valley Water Users Association that "trading only happened when water was in the Peel and licensees in the Namoi wanted it, which isn't a common occurrence".

However, consultation processes over the last decade or more have indicated that the Namoi water users have consistently opposed trade on the basis of the reliability impacts to Lower Namoi water users, and may be choosing to avoid trade. Namoi Water has indicated that it believes there would be impacts to Peel water users if significant inter-valley trade occurred, which would generate wider opposition to inter-valley trade with the Lower Namoi.

Similarly, some Peel water users have expressed concern about the impacts that might arise from inter-valley trade, and have opposed trade arrangements that did not include significant protections against the need to physically supply water inter-valley and from accounting additional water use from trade against the Peel regulated water use limit.

Socio-economic benefits and costs

Permanent and temporary trade can improve overall economic outcomes by allowing available water and licences to move from lower value water uses to highest value water uses. However, trade can also change the geographic location of water use and economic outcomes, producing impacts and benefits to different areas and communities. The within-valley trade that is well established in each regulated river system provides for a range of economic benefits but is more limited in the geographic changes in water use that occur compared to inter-valley trade.

Prices paid for general security licence shares and allocated water in the Lower Namoi regulated river system, are significantly higher than prices being paid in the Peel regulated system. Cotton irrigation in the Lower Namoi provides greater returns per megalitre than the fodder crops typically irrigated along the Peel River, and opening inter-valley trade would normally be expected to result in a net movement of water from the Peel to the Lower Namoi, producing increased economic outcomes in the Lower Namoi, and reduced economic outcomes in the Peel.

The regulated Peel river system is one part of a larger valley economy, along with the major regional centre at Tamworth, dryland agriculture and grazing, and irrigated agriculture from unregulated surface water streams and groundwater. Average use of water for irrigation in the Peel regulated system is about 7 GL/year, with irrigation from each of groundwater and unregulated streams of a similar magnitude[8] in the Peel Valley. Stakeholders have

[8]DPIE Water website dashboard indicates Peel alluvium water use has averaged 5.7 GL/year sine 2010/11. There is no metered use data for unregulated licences, but average usage was estimated at around 8 GL/year during the volumetric conversion process in 2001.

commented on the value of land with attached water licences, and the value to the community of the current irrigated agriculture.

The NRC Review recommended that a distribution of benefits study that includes a cost-benefit study be undertaken as part of the development of a Namoi Regional Water Strategy, to "…assess the best way to distribute the benefit and the changes required in the (Peel Valley water sharing) Plan." Such an assessment is beyond the scope of this review However, it seems likely that the longer-term economic benefits from trade would accrue to the Lower Namoi via increased cotton production, and that there would be a reduction in irrigation along the Peel regulated system.

Regulatory requirements

Under the National Water Initiative, all basin states have agreed to facilitate trade where hydrologic connections and water supply considerations permit.

The Basin Plan continues this approach, and sets more specific requirements to allow trade of water and entitlements free of various constraints including the type of entity involved in the trade, purpose of water use, volumetric limits on trade, management of overallocation, and the level of water use.

However, the Basin Plan does recognise that limits may be placed on trade to recognise physical constraints, hydrologic connections, environmental impacts, transmission losses, and impacts to third parties (other than through increased utilisation of the traded licence).

Administration and operation

All trade arrangements will generate transactions that must be managed in WaterNSW corporate systems. Where separate accounts are required to be maintained, such as inter-valley trade accounts, there would be some additional administration required. Such accounts have been used successfully elsewhere, and pose a moderate administrative burden.

Where the volume of trade and/or inter-valley trade accounts have limits, additional management may be required to ensure access to trade within the limits is able to be managed equitably and in a timely manner. Managing access in this way can pose a more significant administrative burden.

It is noted that NSW and Queensland have not permitted inter-state trade along the hydrologically connected watercourses in the intersecting streams, and have stated that they would only do so "if and when demand increases to a level that justifies the investment in administrative resources"[9]. Given there has only been three permanent trades between the Peel and Lower Namoi regulated river systems over an 11 year period, it is reasonable to question whether there is sufficient demand for trade arrangements to be continued.

Environmental impacts

If a large volume of trade were to occur, and the trade arrangements provided for the delivery of this water from the Peel water source to the Lower Namoi water source, it may

[9] Note to cl.63(3) in the proposed Water Sharing Plan for the Intersecting Streams Unregulated River Water Sources 2011.

result in sustained periods of higher flows in the lower Peel River during peak irrigation periods. This could result in unseasonal high flows that may have a detrimental impact to environmental values in the lower Peel River.

Assessment of Trade Options

The basic conceptual options for permanent and temporary trade, including the existing arrangement and those that have been presented by DPIE Water during the development of Water Resource Plans, are set out and reviewed in this section. These options are assessed against the range of issues set out in the first section of this paper.

Permanent Trade

(P1) Inter-water source permanent trading – existing arrangement

Inter-water source trading involves the cancellation of licences in one valley and the creation of licences in another valley with a conversion factor applied. The provision of flows from the selling valley (Peel) to the buying valley (Namoi) occurs via an inter-valley trade (IVT) account. This is the basis of the current trade arrangements, and includes the following key aspects:

- For trade up to 7,500 shares, water is supplied from the buying valley (Lower Namoi).
- The IVT account only commences when trade reaches the current threshold of 7,500 shares[10]. After this threshold is reached, further trade is accompanied by a delivery of water from the selling valley, up to the current upper limit of trade from the Peel regulated system of 15,000 shares.
- The traded licence receives water allocations made in the buying valley.
- The water use by the traded licence is accounted against valley long-term average use limits and sustainable diversion limits in the buying valley.
- The provisions commenced in 2010 with a conversion factor of 0.4. This was increased to 0.5 in 2019, on the basis that this better represents the effect of transmission losses.

Effect on the Peel regulated system

Reliability of water access

Benefits to Peel general security licences prior to IVT account operating

- Under current arrangements, the cancellation of traded licences in the Peel regulated system, and no associated delivery of water to the Lower Namoi for the first 7,500 shares traded, means there are fewer licences to distribute available water across when calculating AWDs (i.e. there would be 7,500 less shares out of a total of 29,000 general security shares plus 5,000 ML allocated to the Environmental Contingency Allowance with the same priority as general security shares). For the

[10] Cancellation of 7,500 shares from the Peel Valley with a conversion factor of 0.5, would result in 3,250 shares being created in the Namoi Valley.

same volume of water available in Chaffey Dam, this creates an increase in AWDs of up to 15% for remaining Peel general security licences when trade up to the threshold for the IVT account occurs.

Impacts to Peel general security from operation of the IVT account

- Once the threshold number of shares has been traded, and the operation of the IVT account commences, any further traded shares would be supplied from Chaffey Dam.
- The supply of water from the Peel regulated system to the Lower Namoi as part of the inter-valley trade will have a similar effect as increased water use within the Peel Valley. As noted previously, this is normally considered an impact that must be borne by water users. The maximum number of shares that can be traded above the threshold for commencing the IVT account is 7,500 (for a total of 15,000 shares). This, together with the conversion factor of 0.5 limit the scale of water that would need to be supplied from the Peel system each year to a maximum of the AWD for 3,750 shares, together with associated transmission losses to the end of the Peel River system. Earlier modelling[11] by DPIE Water estimated a long-term average allocation of 91% by 30 June, although allocations over the last decade have averaged only 57%.
- Depending on whether the trade is from active or under-utilised licences, supply of water inter-valley would result in less water available in the Peel Valley, and it might be expected that this level of additional water supply would have some impact on Peel general security AWDs.

Effect of conversion factor

- The current conversion factor of 0.5 has been set to align with the potential transmission losses to supply water from Chaffey Dam to the confluence of the Peel and Namoi Rivers in dry times. However, at other times, this is likely to be an over-estimate. For trade up to the threshold for the IVT account to commence, no water is delivered from Chaffey Dam, and the conversion factor acts to limit the reliability impacts in the Lower Namoi regulated river system. As trade increases above 7,500 shares, the conservative conversion factor will act to reduce the impacts to remaining Peel water users from supplying water from Chaffey Dam to the Lower Namoi regulated river system outside of the very dry periods.

Modelling of overall effect of trade

- Modelling of the current trade arrangements by DPIE Water[12] indicates that, whilst AWD's increase for trade up to 7,500 shares, and then decrease as the IVT account is used, general security use is not sensitive to these effects - even if the full 15,000 shares of permitted trade is assumed to occur. The Peel Valley model aggregates water users by river reach, which results in an assumption of "perfect trade" within each river reach as shares are moved inter-valley. Given the large proportion of

[11] Water availability in New South Wales Murray-Darling Basin regulated rivers, NSW Department of Water and Energy, 2009.

[12] Water resource planning Model scenario report, Namoi: Peel to Lower Namoi permanent trade (April 2018).

under-utilised licences in the Peel regulated system, the aggregation of water users in the modelling effectively assumes:
    - trade out of the valley effectively occurs from unutilised licences, and
    - trade within each river reach will make up for any reduction in access for active water users
- In practice, any increased need to trade water within the Peel Valley will be seen as an impact by active water users.
- The modelling does indicate that the minimum storage levels in Chaffey Dam would decrease as trade exceeds the 7,500 share threshold for activation of the IVT account, although not below 20%. However, the simulation period for the modelling was 1895 – 2009, and does not cover the recent record-low inflows from 2017 to 2020. It could be expected that trade volumes significantly above 7,500 shares would likely have reduced storage levels and increased the restrictions during the latest drought to some degree for Peel regulated water users and Tamworth Regional Council.

Managing to water use limits (LTAAEL, SDL)

Accounting the use of traded water against water use limits in the buying valley is different from all other existing inter-valley trade arrangements. This approach avoids the potential for more significant reductions in water access in the Peel valley to maintain diversions within the water use limits.

Water charges

Cancelling licences in the selling valley and creating licences in the buying valley is also different from arrangements elsewhere, and creates changes in the cost base in each valley. For the Peel regulated system, the cost base could be reduced by as much as 31%. However, the increase in licensed entitlements would provide a very small increase in the Lower Namoi cost base.

Effect on the Lower Namoi regulated river system

Reliability of water access

The current permanent trade arrangements, and the variations of this considered by DPIE Water during the Namoi Surface Water Resource Plan development all result in a relatively small reliability impact for Lower Namoi water users before an IVT account commences. In this circumstance there is no additional water supplied from the Peel system, and the water available for allocation in the Lower Namoi must be shared across the existing pool of licence shares plus the traded shares. However, the scale of trade prior to the commencement of an IVT account is limited to 3,750 shares, which is less than 2% of the general security shares in the Lower Namoi.

Conversely, following the commencement of an inter-valley trade account there will be additional small reliability impacts and benefits for Lower Namoi water users from year to year. This arises from the difference in AWDs for the Peel general security licences (and hence credits to the IVT account), and the AWDs for the Lower Namoi general security licences (and hence the volume of water allocated to the additional shares from trade).

Modelling by DPIE Water confirms that increases in water use by those who buy general security shares from the Peel would be offset by small reductions across all other water users for trade up to the commencement of the IVT account. Additional water supply via the IVT account would result in some minor benefits and impacts in the Lower Namoi from year to year, depending on the differences in AWDs between the two systems.

Other implications

As noted above for the Peel regulated system, accounting the use of traded water against water use limits in the buying valley avoids the potential for more significant reductions in water access in the Peel valley to maintain diversions within the water use limits, but instead places the burden of managing any growth in water use on the Lower Namoi. However, the limited scale of trade in comparison to the Lower Namoi water use limit means that there are unlikely to be any significant reductions in the maximum AWD for supplementary water access licences to manage growth in use.

As noted above for the Peel regulated system, cancelling licences in the selling valley and creating licences in the buying valley increases the cost base in the Lower Namoi regulated river water source, which reduces costs per licence share and per megalitre of water used.

Operation and administration

Operation and administration costs under current arrangements include:

- the systems to manage trade transactions, and
- the systems and operational resources to manage an IVT account.

Most of the functional requirements for systems to manage trade transactions are required to manage the existing within-valley trade, and should now be in place to administer the existing arrangements. The IVT account, which is yet to be administered, would require specific additional functionality and integration between licensing and operation areas of WaterNSW, and would be expected to have some additional costs to be operational.

Variation of existing arrangements investigated by DPIE Water

A variation on this basic model has been considered by DPIE Water and presented to the Namoi Stakeholder Advisory Panel (SAP)[13] , with no IVT account and a lower overall limit for trade. This option was simpler and has fewer operational and administration costs, but still had similar small reliability impacts to general security licences in the Lower Namoi.

(P2) Tagged entitlement trade

Tagged trade is a system that allows licences in one valley to link to a works approval in another valley, thereby establishing a “tag” or “link” to allow water ordering to occur.

The tagged licence continues to operate as if it were in the selling valley, and:

- receive water allocations made in the selling valley,
- pay fees and charges in the selling valley, and

[13] The Stakeholder Advisory Panel consists of Peel and Namoi stakeholders, and was constituted by DPIE water for consultation on the development of a Surface Water Resource Plan for the overall Namoi Valley.

- have water use accounted against the selling valley water use limits.

Water is ordered and used from the work approval in the buying valley, and an equivalent volume of water is made available from the selling valley through bulk deliveries from an inter-valley trade account. This is the trade system currently operating in the southern connected basin and the Border Rivers.

A conversion factor could be applied to each water order to allow for additional transmission losses incurred to deliver the order in the buying valley.

The key features of this approach is that there are no benefits or impacts from changes in the cost base, there are no reliability impacts to other water users in the buying valley, and the water use is accounted against the valley where the licence originated (avoiding the need to adjust water use limits in the selling and buying valleys).

Effect on the Peel regulated system

Reliability of water access

There are no reliability impacts through differences in water available in any year in the Peel and Lower Namoi regulated systems. However, under this approach there would be water supplied from Chaffey Dam for all general security shares traded from the Peel system (i.e. no trade volume threshold before establishing the IVT account), and this would increase the drawdown of Chaffey Dam, and more significantly affect AWDs for general security licences than the existing arrangements. It could also be expected that restrictions to water users and Tamworth Regional Council during very times would be exacerbated.

Managing to water use limits

The use of water by the traded licences would be accounted against the selling valley's water use limit, and it is probable that most traded licence shares would not have been highly utilised previously. This would represent growth in water use. The high level of underutilisation of licences in the Peel regulated water source means that it is susceptible to significant reductions in general security AWDs to ensure that diversions remain within the water use limit.

Cost base

Maintaining traded licences in their valley of origin avoids changes to the cost base for licence shares. It is likely that licence shares traded out of the Peel regulated system were under-utilised, and the existing level of water use in the Peel would not be directly affected. This would help avoid changes to the cost base for water use charges. However, the increased utilisation of traded licences and larger releases from Chaffey dam to supply the licences traded to the Lower Namoi will reduced AWDs for general security, and indirectly affect the cost base for water use charges.

Effect on the Lower Namoi regulated river system

Reliability of water access

As for the Peel regulated system, there would not be any reliability impacts in the Lower Namoi, as the water available to the traded licences would still be based on general security

AWDs in the Peel regulated system, and the water would be supplied from the Peel regulated system.

Managing to water use limits

Water use by traded licences would be accounted against the water use limits in the selling valley, and would have little effect on the compliance with water use limits in the Lower Namoi water source.

Cost base

As noted above, maintaining traded licences in their valley of origin avoids changes to the cost base for licence shares. The level of water use in the Lower Namoi would increase, and the usual practice elsewhere is to levy the water use charges in the valley where the take of water actually occurs. This would increase the cost base for water use charges in the Lower Namoi.

Operation and administration

Tagged trade requires licences in one water source to be linked to licences in another water source, and for water orders in the buying valley to be able to be checked back against the licence in the selling valley. The IVT account is also adjusted on the basis of water orders rather than AWDs. These requirements significantly increase the functionality required of administrative systems and requires a more complex operation of the IVT account, all of which increases the costs of implementation and ongoing operation significantly.

Variation of tagged trade

An option for tagged trade was considered by DPIE Water that required the supply of water for the traded licences to be made from Keepit Dam (even though water available to the tagged licence was based on Peel general security AWDs), and the water use was accounted against the Lower Namoi water use limit. This option helped address the issue of reducing the cost base in the Peel regulated system, avoided reliability impacts to the Peel regulated system, and avoided the potential for more significant reductions in maximum general security AWDs to comply with the water use limit.

However, these variations did introduce reliability impacts to the Lower Namoi water users similarly to the current trade arrangements, and increased operational and administrative complexity and costs.

(P3) No trade

The options for permanent inter-valley trade presented above all have some drawbacks.

The very low uptake of inter-valley trade between the Peel and Lower Namoi regulated systems suggests that demand for inter-valley trade is very low, and raises the issue of the cost effectiveness of developing and operating a trade system.

With only three permanent trades in 11 years, the improvement in overall economic outcomes may not justify the costs associated with developing and maintaining the current inter-valley trade arrangements.

It is noted that NSW and Queensland have not permitted trade along the hydrologically connected watercourses in the intersecting streams, and have stated that they would only

do so "if and when demand increases to a level that justifies the investment in administrative resources"[14]. Given the lack of demand for inter-valley trade to date, a similar view could be taken for trade between the Peel and Namoi regulated water sources.

If there is no option that sufficiently or efficiently protects other water users or the environment from impacts as a result of the trade, then it may be appropriate that trade is not permitted between the Lower Namoi and Peel regulated systems.

[14] Note to cl.63(3) in the proposed Water Sharing Plan for the Intersecting Streams Unregulated River Water Sources 2011.

Table 2: Summary table of qualitative impacts and benefits of permanent trade options

Trade Option	Reliability impacts	Cost implications	Risk & impact of growth in use actions[2]	Socio – economic impacts	Implementation costs
P1 - Inter-water source permanent trading (existing scenario)	Peel –initial small increase in AWDs, then small reduction in AWDs as trade increases[2] Namoi – minor impacts up to trade threshold for IVT account	Peel –moderate to high impacts, with up to 50% reduction in cost base Namoi –minor benefits from increase in cost base	Peel – None Namoi –minor growth in use unlikely to result in significant management actions	Peel –minor impacts or benefits[1] up to trade threshold for IVT account, minor impacts with further trade Namoi – very minor impact up to trade threshold for IVT account	Low to moderate, depending on level of trade
P1A - no trade threshold for IVT account	Peel - Small reduction in AWDs as trade increases[2] Namoi - none	Peel – moderate to high impacts, depending on level of trade Namoi –minor benefits	Peel - moderate to high depending on level of trade	Peel – more significant, depending on level of trade	Moderate
P2 – Tagged entitlement trade	Peel – small reduction in AWDs as water use increases[2] Namoi - none	No changes to cost base in either system	Peel: moderate – high depending on level of trade	Peel – more significant, depending on level of trade	High
P2A – Tagged trade with threshold for IVT account (previous DPIE Water option)	Peel –initial small increase in AWDs, then small reduction in AWDs as trade increases[2] Namoi – minor impacts up to trade threshold for IVT account	No changes to cost base in either system	Peel – None Namoi –minor growth in use unlikely to result in significant management actions	Peel –minor impacts or benefits[1] up to trade threshold for IVT account, minor impacts with further trade Namoi – very minor impact up to trade threshold for IVT account	Moderate to high depending on level of trade

[1]Trade from active water users in the Peel valley could reduce irrigation production, but may help sustain those enterprises. Trade from inactive water users would not directly reduce irrigation production, and would provide additional income for inactive licence holders.

[2]Impacts arising from increased utilisation of other licences is a reliability impact, or management action to maintain water use limits, that is normally expected to be borne by water users.

Temporary Trade

(T1) Previous inter-water source temporary trade trial

A volume of account water is debited from a licence in the selling valley and that volume is reduced by a conversion factor and then credited to a licence in the buying valley. However, the provision of flows from the selling valley (Peel) to the buying valley (Namoi) via an IVT account does not commence until the threshold volume of trade has been reached. This was the basis of the previous trial arrangements from 2014 - 2019, and includes the following key aspects:

- The IVT account commences when the combined trade (permanent and temporary) exceeds the combined threshold of 7,500 shares[15] plus account water.
- Deliveries for trade below the combined threshold of 7,500 shares plus account water are supplied from the buying valley (Namoi).
- A combined trade limit of 15,000 shares plus account water.

Water is ordered and supplied in the buying valley. Once the combined threshold of trade has been met, the same volume is credited to an inter-valley trade account in the selling valley that can be called upon by the river operator in the buying valley.

The water use by the traded licence is accounted against valley long-term average use limits and sustainable diversion limits in the buying valley.

This trial approach has much the same impacts and benefits as the existing permanent trade arrangements. There are small reliability impacts and risks of small reductions in maximum AWDs to manage water use limits for the Lower Namoi regulated system, and there is potential for benefits in to the Peel regulated system until trade volumes reach the threshold for commencement of the IVT account, and impacts when trade exceeds this threshold.

(T2) Inter-valley allocation trade

A volume of account water is debited from a licence in the selling valley and that volume is then credited to a licence in the buying valley. Water is ordered and supplied in the buying valley. The traded volume is credited to an inter-valley trade account in the selling valley that can be called upon by the river operator in the buying valley.

This is the approach taken in the southern connected basin, and is similar to the temporary trade trial except that in the southern connected basin:

- a conversion factor of 1[16] is used,
- there is no trade volume threshold to be supplied by the buying valley before the inter-valley trade account is credited, and
- water use is accounted against valley long-term average use limits and sustainable diversion limits in the selling valley.

The key differences between this approach and the trial approach (T1) is that the protections for Peel water users are not in place (trade volume threshold before

[15] Cancellation of 7,500 shares from the Peel Valley. With a conversion factor of 0.5, this would result in 3,250 shares being created in the Namoi Valley.

[16] Noting that a conversion factor of 1 was used during the trial period for the Peel Valley in any case.

commencing the IVT account, conversion factor less than 1, and accounting water use associated with trade against the Lower Namoi regulated system water use limit).

(T3) Tagged allocation trade

A temporary "holding" account is created in the selling valley that can be linked to a works approval in the buying valley. The holding account can receive account water via trade in that valley, with a volume of account water debited from a licence in the selling valley and that volume credited to the holding account in the selling valley. The volume traded to the holding account is also credited to an inter-valley trade account in the selling valley that can be called upon by the river operator in the buying valley.

This is the trade system currently operating in the Border Rivers, but with a conversion factor of 1 applied.

A conversion factor could be applied to each allocation trade (before crediting the inter-valley trade account) to allow for additional transmission losses incurred to deliver the order to the buying valley.

The licence selling the account water remains unchanged (other than being debited the traded account water), and continues to receive water allocations made in the selling valley.

The use of the traded water is accounted against valley long-term average use limits and sustainable diversion limits in the selling valley.

As with the permanent tagged trade option, this temporary tagged trade option avoids reliability impacts and cost base impacts, but does not provide the same protections for Peel water users as the trial temporary trade arrangements (trade volume threshold before commencing the IVT account, conversion factor less than 1, and accounting water use associated with trade against the Lower Namoi regulated system water use limit).

Tagged trade also requires more significant enhancements to the operational systems used to manage water accounts and trade.

(T4) No trade

The options for temporary inter-valley trade presented above all have some drawbacks.

The very low uptake of inter-valley temporary trade between the Peel and Lower Namoi regulated systems suggests that demand for inter-valley trade is very low, and raises the issue of the cost effectiveness of developing and operating a trade system.

With only five temporary trades in 5 years, the improvement in overall economic outcomes may not justify the costs associated with developing and maintaining the current inter-valley trade arrangements.

Table 3: Summary table of qualitative impacts and benefits of temporary trade options

Trade Option	Reliability impacts	Cost implications	Risk & impact of growth in use actions[2]	Socio – economic impacts	Implementation costs
T1 - Previous inter-water source temporary trade trial	Peel – initial small increase in AWDs, then small reduction in AWDs as trade increases[2] Namoi – minor impacts up to trade threshold for IVT account	Peel – likely none if trade is from an inactive licence, otherwise minor reduction in cost base (usage). Namoi –minor benefits from increase in cost base (usage)	Peel – None Namoi –minor growth in use if consistent pattern of trade, unlikely to result in significant management actions	Peel –minor impacts or benefits[1] up to trade threshold for IVT account, minor impacts with further trade Namoi – very minor impact up to trade threshold for IVT account	Low to moderate, depending on level of trade
T2 – Inter-valley allocation trade (as per southern basin)	Peel - small reduction in AWDs as trade increases[2] Namoi - none	As above	Peel – if there is a consistent pattern of trade, moderate to high depending on level of trade Namoi - none	Peel – more significant, depending on level of trade	Moderate
T3 - Tagged temporary trade	Peel - Reduction in AWDs as water use increases[2] Namoi - none	No changes to cost base in either system	Peel: moderate – high depending on level of trade	Peel – more significant, depending on level of trade	High

[1]Trade from active water users in the Peel valley could reduce irrigation production, but may help sustain those enterprises. Trade from inactive water users would not directly reduce irrigation production, and would provide additional income for inactive licence holders.

[2]Impacts arising from increased utilisation of other licences is a reliability impact, or management action to maintain water use limits, that is normally expected to be borne by water users.

Stakeholder advice

Previous consultation with stakeholders in both the Peel and Namoi Valleys has consistently shown that no collective agreement on trade arrangements has been reached for any of the options proposed as part of the original water sharing plan consultation, the temporary trade trial, or the more recent Stakeholder Advisory Panel process as part of the Water Resource Plan consultation. The options for trade considered to date are all thought to have impacts to one or more of the stakeholders.

As part of this review, initial discussions were held with the Peel Valley Water Users Association, and Namoi Water.

Lower Namoi water user concerns

Lower Namoi regulated system water users are fundamentally concerned that the two regulated river system could be merged into one, which they believe would increase water charges for Lower Namoi water users, and activation of under-utilised licences in the Peel Valley could lead to reductions in maximum AWDs that are shared more broadly across Lower Namoi and Peel water users.

Namoi water users have opposed current trade arrangements on the basis that they have a reliability impact on general security licences in the Lower Namoi water source, albeit on a small scale. Namoi Water has indicated that the variations on the current inter-water source trade considered to date by DPIE Water all continue to have a reliability impact on general security licences om the Lower Namoi water source.

Namoi Water expressed concern that forms of trade that avoided reliability impacts on the Lower Namoi, such as tagged trading, could provide further impetus to combining the Peel and Namoi valleys as one.

Namoi Water has pointed to opposition from the Upper Namoi community to moving water between Split Rock and Keepit Dams as part of current operations in the Namoi valley, and believe that the Peel valley community would also oppose supply of water from the Peel to Lower Namoi. They have indicated that any option for inter-valley trade that protects lower Namoi reliability will simply increase antipathy between the communities – particularly if inter-valley trade is seen as exacerbating the security of supply issues for Tamworth Regional Council.

As a consequence of these concerns Lower Namoi (and Upper Namoi) water users oppose trade, and have supported the option to have no inter-valley trade.

Peel water user concerns

Peel regulated system water users are fundamentally concerned that their high water use charges impact on the economic viability of general security irrigation, and that the low water use limit (in comparison to entitlements) is unfair.

Peel water users have previously been generally supportive of inter-valley trade with significant concessions to avoid the need to physically supply water to the Lower Namoi and avoid accounting water use associated with trade against their water use limit. However, they remain concerned about impacts that might arise from higher levels of trade and, given

the low levels of trade that has occurred, have expressed support for the option to have no inter-valley trade.

Concern was also raised that trade should not be considered in isolation of other proposals such as enlarging Dungowan Dam.

Discussion and recommendations

The Peel regulated system is in an unusual situation, with a relatively small volume of entitlement, and very low water use and plan limit compared to that entitlement. Even a small amount of activation of under-utilised licences through trade or within the valley could require a significant reduction in the maximum general security allocation to bring water use back within the water use limit. The Peel regulated system also has the issue of high operating costs compared to the small cost base.

The 2020 NRC review noted the significant difference between entitlement levels and the water use limit for the Peel regulated river water source, highlighting that there was a risk that licence activation could lead to growth in water use and the water use limit being exceeded. The NRC recommended that DPIE Water review the potential impacts of licence activation and, as part of the Regional Water Strategy, investigate options to manage risks associated with activation of licences such as water sharing plan amendments and structural adjustment.

Whilst structural adjustment options such as buyback of unused licences might well reduce the potential for activation of unused licences, it may exacerbate other issues, such as reducing the cost base and increase the water charges per share.

Existing arrangements strike a balance

The existing trade arrangements are not typical of inter-valley trade regimes elsewhere and provide significant protection against many of the potential impacts that would arise from such trade for the Peel general security water users. This protection comes at the cost of relatively small reliability impacts to the Lower Namoi general security water users, and potentially impacts to supplementary access licence holders if the water use limit for Lower Namoi regulated system is exceeded. If these protections for Peel water users were not included, and there was a net movement of water use from the Peel to the Lower Namoi over time, the economic impacts at a valley-scale may not be large. However, there has been strong community support for maintaining the relatively small irrigation industry in the Peel Valley.

The existing arrangements provide a reasonable balance between tolerable impacts for both valleys, and there is no other trade arrangement that clearly provides a better outcome when all of the issues that form the terms of reference for this review are taken into account. It is understood that the MDBA has not raised any specific issues regarding the existing inter-valley trade arrangements during the assessment of the Namoi Surface Water Resource Plan submitted by NSW.

No trade option

The very low level of observed permanent and temporary inter-valley trade is also significant. Given the region has recently experienced the worst drought on record, and the inter-valley trade arrangements have been in place during a range of wet and dry water years, this lack of observed trade is even more significant. Whilst the precise drivers for this are unclear, the lack of trade means that there is little economic benefit arising from developing and maintaining the inter-valley trade provisions. Further consideration should be given to whether the administrative and operational costs outweigh the overall

economic benefits of inter-valley trade, and whether NSW should take a similar approach to that for inter-state trade in the intersecting streams.

The security of supply for the city of Tamworth is also an important factor. If augmentation of water supply through infrastructure improvements such as the proposed enlargement of Dungowan Dam prove to be prohibitively expensive, other measures may need to be considered. In this context, trade arrangements that place further pressure on storage levels in Chaffey Dam may need to be reconsidered.

Findings and specific recommendations:

- The current permanent trade arrangements provide a reasonable balance between impacts in the Peel and Lower Namoi regulated systems, compared to other potential models for inter-valley trade.
- The administrative and operational costs and the overall benefits of inter-valley trade should be reviewed and consideration given to whether ceasing inter-valley trade until there is a demonstrated level of demand for trade is appropriate.

Attachment 1 – Trade data

The following charts of permanent and temporary trade data within each of the Peel and Lower Namoi regulated systems has been taken from the dashboard facility on the DPIE Water website.

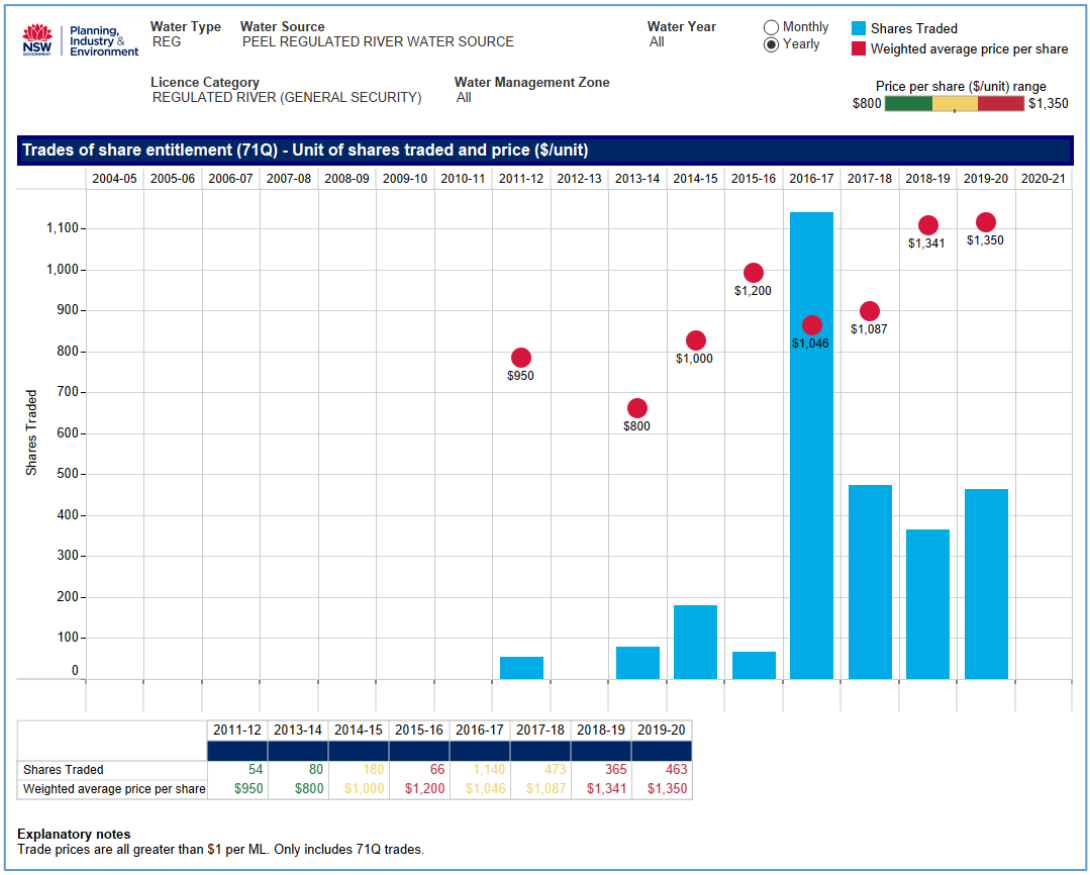
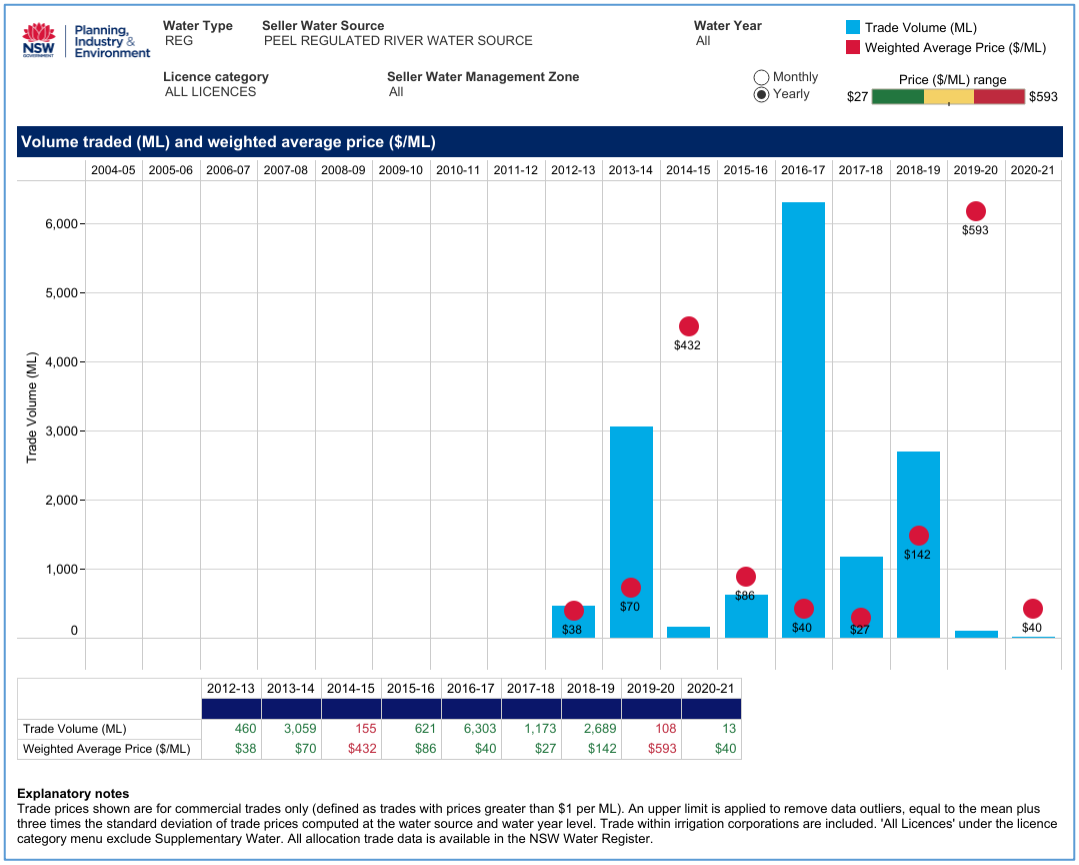
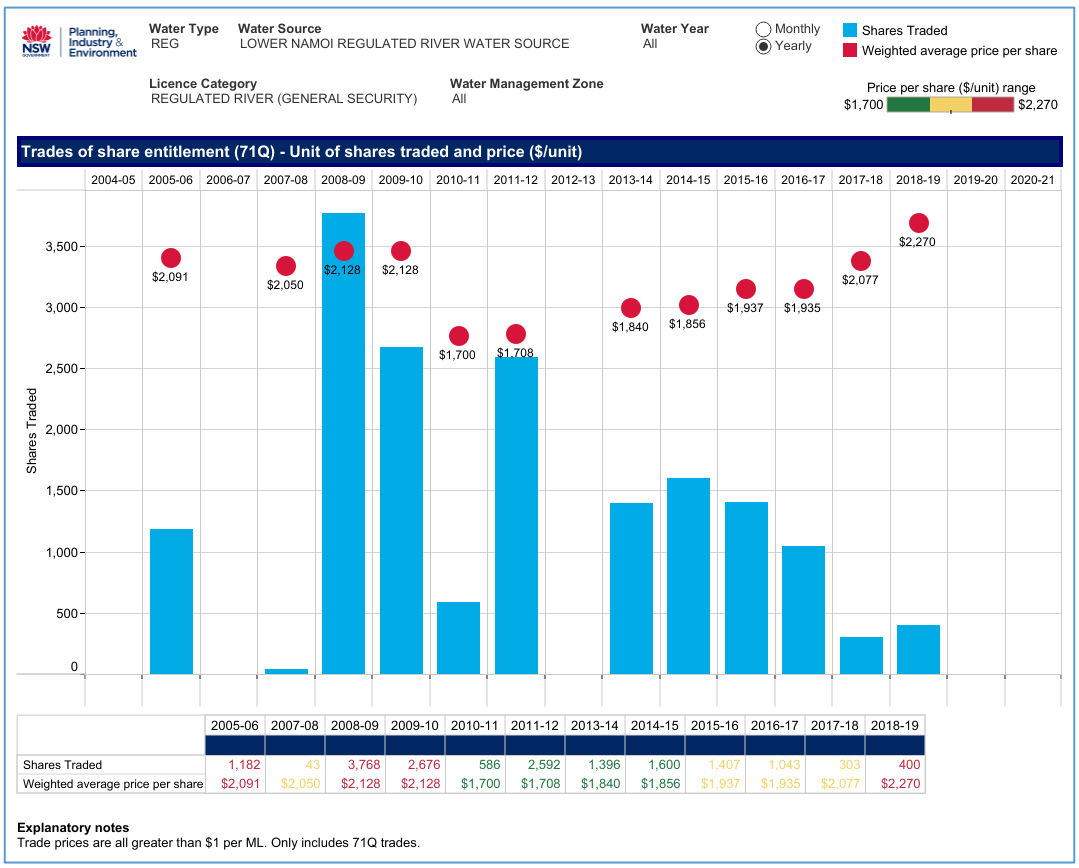


Figure 2: Peel regulated system entitlement trade history



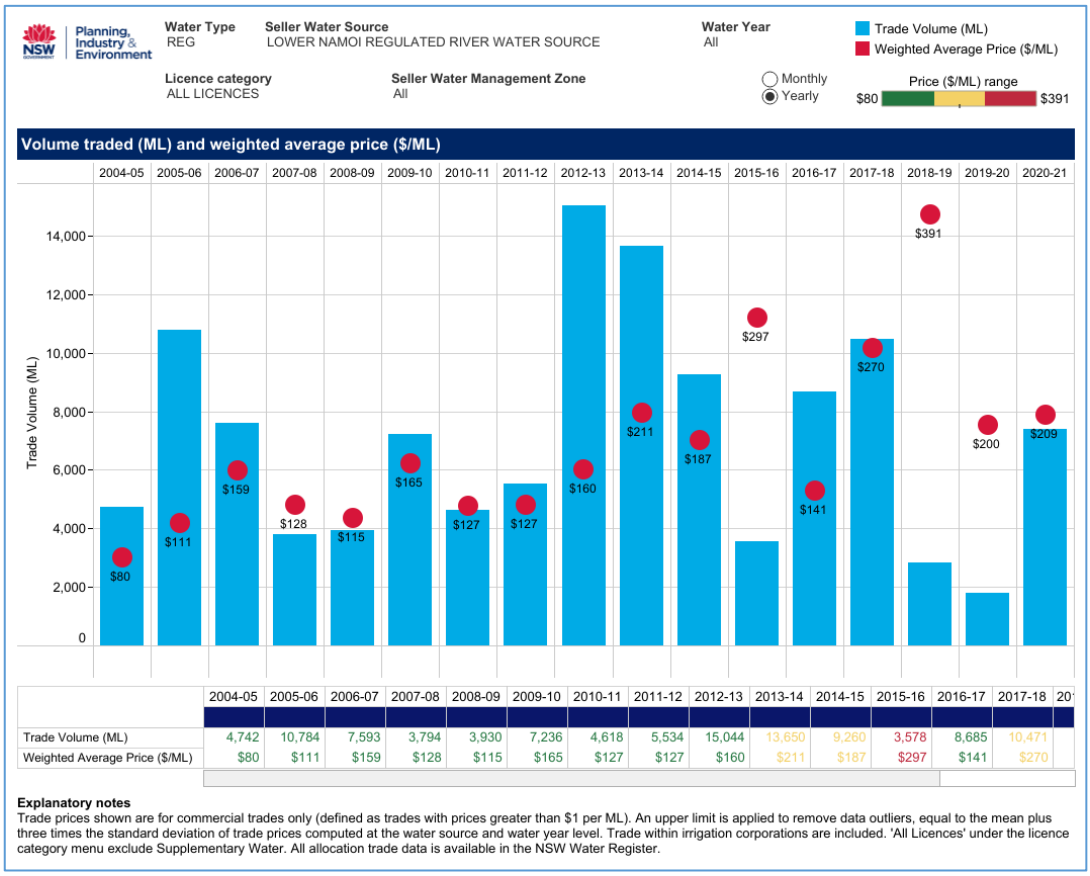
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trade Volume (ML)	460	3,059	155	621	6,303	1,173	2,689	108	13
Weighted Average Price ($/ML)	$38	$70	$432	$86	$40	$27	$142	$593	$40

Figure 3: Peel regulated system allocation trade history



	2005-06	2007-08	2008-09	2009-10	2010-11	2011-12	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Shares Traded	1,182	43	3,768	2,676	586	2,592	1,396	1,600	1,407	1,043	303	400
Weighted average price per share	$2,091	$2,050	$2,128	$2,128	$1,700	$1,708	$1,840	$1,856	$1,937	$1,935	$2,077	$2,270

Figure 4: Lower Namoi regulated system entitlement trade history



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Trade Volume (ML)	4,742	10,784	7,593	3,794	3,930	7,236	4,618	5,534	15,044	13,650	9,260	3,578	8,685	10,471
Weighted Average Price ($/ML)	$80	$111	$159	$128	$115	$165	$127	$127	$160	$211	$187	$297	$141	$270

Figure 5: Lower Namoi regulated system allocation trade history