

**RMCG**

NOVEMBER 2019

# Recognising underuse in the Southern Basin - and taking action. Methodology and analysis.

Final Report

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## **IMPORTANT NOTICE REGARDING THIS REPORT**

**Please note this report has been commissioned by Ricegrowers Limited (SunRice) to present an analysis of water use in the Southern Basin within the context of current policy settings. The views expressed in this report are RMCG's and should not be construed as an endorsement by the company.**

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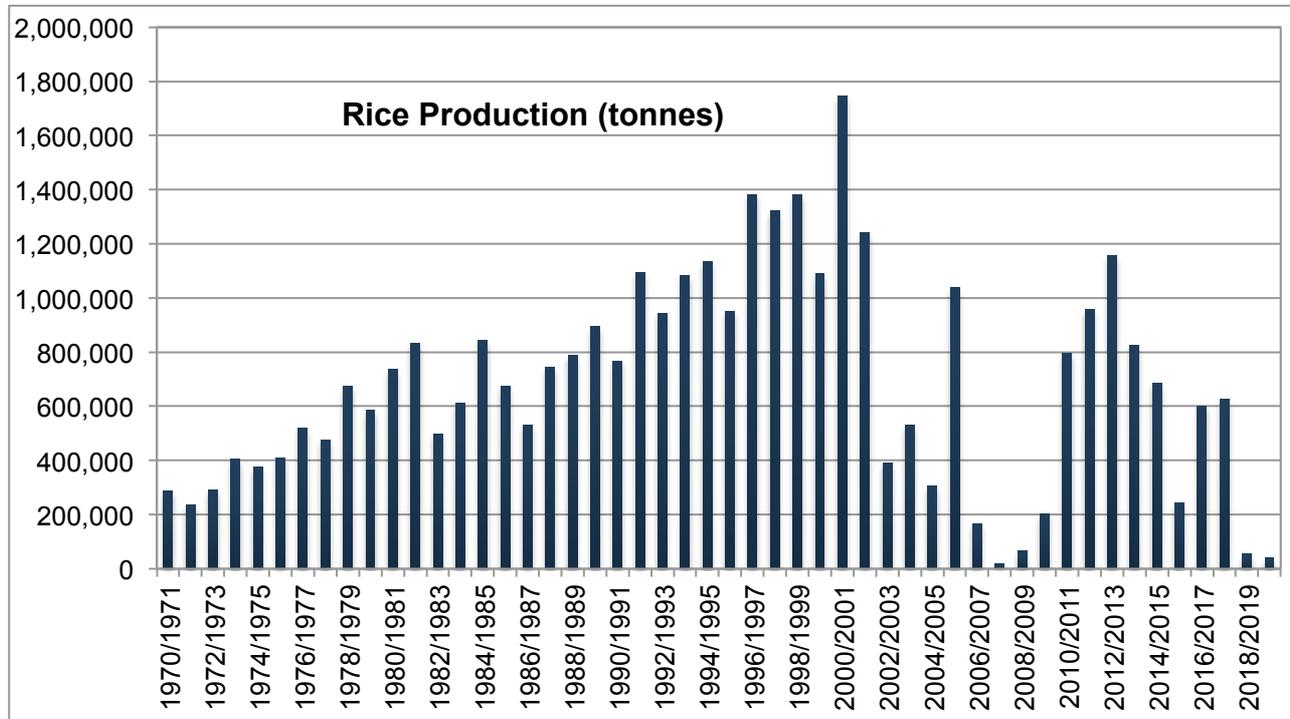
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# 1 Introduction

The rice industry expanded throughout southern NSW over the period 1970's to 2000 with production rising consistently from 0.2 to 1.7 million tonnes. In the last twenty years production has been extremely variable ranging from almost zero production up to 1 million tonnes annually depending upon the available water, as illustrated.



**Figure 1-1: Rice production**

In recent times the available water appears to have taken a steep change downwards and this appears to be much lower than anticipated even allowing for climatic conditions, transfer of water to other crops and Government water recovery programs.

This change in available water has led Ricegrowers Cooperative Pty Ltd (or SunRice) to request that RMCG review, compare and make recommendation for action if required in regard to:

1. The aims of the Murray Darling Basin Plan (2012) in terms of water recovery targets
2. The principles agreed to between States and the Australian Commonwealth in developing and signing-off on the 2004 National Water Initiative
3. The current allocation policies, water sharing practices, trading of water and water use particularly in relation to the NSW Murray and the Murrumbidgee Valleys.

In response, RMCG have undertaken an analysis of water use within the southern Murray Basin. The initial analysis by RMCG is based on water use and availability data collected by RMCG over many years, and particularly the MDBA's – Transition Period Water Take Report 2017/18 – report on Cap compliance and transitional SDL accounting (published by the MDBA in July 2018).

This analysis particularly focuses on water users dependent on irrigating using allocations derived from NSW General Security Entitlements and Supplementary Water in the NSW Murray and the Murrumbidgee Valleys, and Victorian Low Reliability Water Share owners in the Goulburn and Murray Valleys. The analysis has found that there has been an unexpected steep change in water use by these irrigators. In the nine year period between 2009 and 2019, annual average water use in NSW of combined Murray and Murrumbidgee General Security (GS) and Supplementary (Sup) Entitlements has reduced by 1650GL to 46% of the long term average.

This report addresses the reasons for the steep change and associated inequities that this has created. From this understanding, the opportunities for action and next steps to implement these opportunities are outlined.

This report has been provided to SunRice to substantiate the key findings outlined in a separate short form report provided to the SunRice Chair, Laurie Arthur earlier in October 2019.

# 2 Transition Period Water Take Report 2017/18 (MDBA)

## 2.1 CAP MODELLING

Since first preparing the report in 2015, the MDBA have been providing an annual report comparing water use throughout the Murray Darling Basin with the *1995 Cap on diversions* or The Cap, agreed between the Commonwealth and the States. The Cap has been the basis for limiting diversions throughout the basin and is the basis for establishing Sustainable Diversion Limits or SDL's for each water source throughout the Basin. The SDL's are a corner stone of the Murray Darling Basin Plan. Sustainable Diversion Limits, which are a limit on diversions by water users other than the water diverted for the environment, take effect from June 2019.

The MDBA have been producing the transition reports based on Cap compliance, as a proxy for SDL diversion limits being formalised, commencing with a report of the 2012 water year. The latest report, which measures water use for almost twenty years up to June 2018 was published in July 2019. The data collection and analysis of use contained within the report covers the whole basin, however the report focuses on the Southern Connected Murray Darling Basin.

***The MDBA transition report provides an up to date analysis of water use and provides the basis for the analysis of the underuse by irrigators in the southern connected basin.***

## 2.2 CAP MODELLING AND THE SUSTAINABLE DIVERSION LIMIT

*The Transition Report 2017-18* outlines the comparison between the current Cap modelling and the ultimate Sustainable Diversion Limit or SDL modelling. The report uses the best available data from the MDBA River Operations Group, the Basin States and also uses data provided by the Commonwealth Environmental Water Holder regarding the ownership, allocation and storage of environmental water.

The report provides a summary table of the key features of the two approaches i.e. "*Table 1-1: Comparison of the key features of Cap and SDL water accounting and compliance*".

RMCG's summary of the key differences between the approach are:

- i. Groundwater – The SDL modelling also extends to monitoring groundwater use, and the use in several more than the twenty four 'cap valleys' identified in the 1995 'Cap' agreement. In terms of evaluating the issues associated with underuse by irrigators this aspect is not a significant difference.
- ii. Water Recovery – The SDL's adopted are effectively the cap volumes (see item iii. below) less the water recovered for the environment. However, the cap accounting in the transition report takes into account water recovery as well as climatic conditions. Thus, this difference has been accounted for.
- iii. Cap Factors – The cap Factors are similar to the SDL LTAAY in most cases except for some of the NSW valleys where revised factors for many important entitlement types were adopted in 2018. Effectively reducing the available volume in those valleys. However, it is noted that the SDL adjustments and water recovery calculations were based on the original Cap Factors, not the recently adjusted factors.



***Therefore, the cap accounting recorded in the transition report in terms of water use is the same as would occur under SDL accounting except for the addition of groundwater considerations and the use of modified factors in some NSW valleys.***

***Thus, the transition report of cap accounting (adjusted for water recovery) enables the evaluation of compliance with the Basin Plan projections and SDL's.***

## **2.3 ABOUT THE REPORT**

Under the terms of the Basin Plan, the MDBA is required to report actual water use against the 1995 Murray Darling Basin Cap (The Cap) targets for each valley throughout the Murray Darling Basin. The report is called The *Transition Water Take Report 2017-18*. This critical activity, to measure the changing balance towards a greater environmental component of water used as the Murray Darling Basin Plan is implemented, and to measure irrigator use against The Cap benchmark, ensures compliance by users during the period of transition, as every river basin throughout the MDB develops a Sustainable Diversion Limit or SDL under the terms of the Basin Plan.

The latest report relates to water use and allocation up to June 2018, has been produced by the MDBA since reporting commenced on the 2012/13 water year, and was published in July 2019. Tony McLeod is the lead author with the MDBA. Tony is well respected and has a strong understanding of water allocation and use.

The use of the 1995 Cap as a benchmark is now almost redundant, as reporting against benchmarks moves from state-based reporting against “Cap”, to the Commonwealth and SDL's. The new SDL limits are to be included into Commonwealth Minister approved Water Resource Plans (WRP's) for each valley, and to apply from 1 July 2019. Some States, particularly NSW have not yet finalised the drafting of compliant Water Resource Plans.

Importantly the new Sustainable Diversion Limits will be based on diversions for use by irrigators and others in addition deduct environmental water holdings. As discussed above though this transition report has been adjusted to allow each year for the growing volume of environmental water held by Governments.

In NSW the practical matters of water allocations, water entitlement management and river operations are outlined in State Instruments, or Water Sharing Plans. The Water Sharing Plans are currently being revised to be “WRP compliant” and will become subservient documents to the approved WRP's. RMCG believes changing water sharing arrangements by State Governments to meet adaptive management requirements (for example), once WRP's are endorsed by the Commonwealth Minister and are adopted, will be difficult thus may require approval of the Commonwealth and other State Governments.

The executive summary of the report confirms that the 2018 report attempts to create the basis for future SDL compliant reporting. The summary indicates although the report has “no compliance status” it has adopted the same basis for reporting as will be applied from 1 July 2019, as set out in the Basin Plan.

In the Forward to the report released July 2019 by Joanna Hewitt AO, acting MDBA Chair noted:

*Readers may be interested in the analysis of the cumulative Cap credits that is provided in this report. The MDBA expects that the factors influencing accumulation of credits will be less pronounced post 2019. Moving forward the methods used to determine how much water is permitted to be taken each year under the Basin Plan will reflect current levels of development rather than those that existed in 1993-94, which is the reference level of development for Cap.*

This analysis is interesting because it clearly acknowledges compliance, or rather significant underuse by irrigators in almost every valley. It also suggests that in future this underuse by irrigators will no longer be recognised.

RMCG suggest that the only practical way that the current level of development will become the reference level is by two possible actions:

- i. To reduce the volumes by the water recovered
- ii. To change the LTAAY (which replace the cap factors) to reflect revised yield based on:
  - a. Assumed climatic change
  - b. Government policies that have occurred e.g. more conservative reserve policies
  - c. Changed irrigator behaviour e.g. use of carryover.

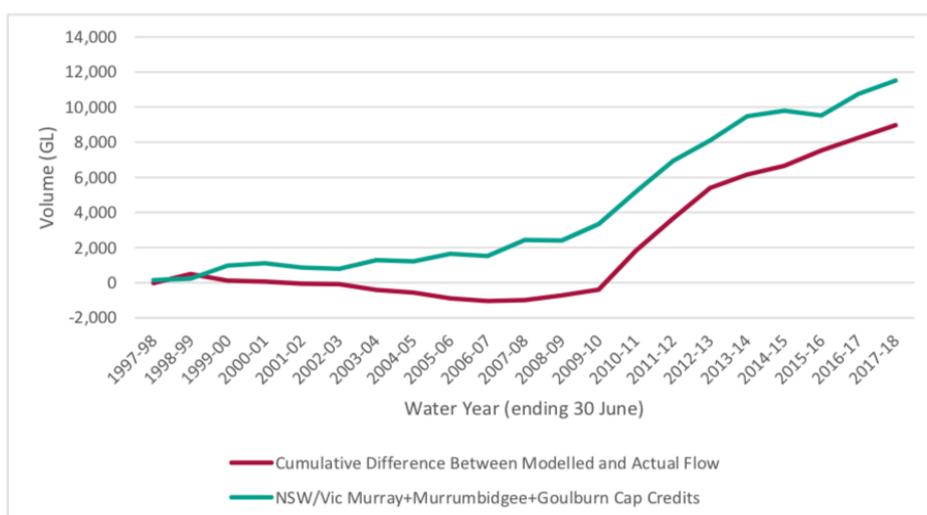
The first action is well understood and has been already accounted for in the transition report accounting. However, the second action (partially implemented in some valleys e.g. NSW) is problematic and not yet well understood in terms of impact on irrigators.

***The transition report forms the basis of future SDL compliant reporting however the MDBA have flagged changes to reflect the “current levels of development” without defining what that might mean.***

## 2.4 REPORT FINDINGS OF UNDERUSE

Some of the most important findings in the *Transition Water Take Report 2017-18* Executive Summary, and the reason for this report by RMCG, is that there has been:

1. Cap compliance over kill (or underuse) of water in all States. In the case of the Murray River the underuse has been very large.
2. A large ‘cap credit” or underuse against the benchmark use agreed, particularly since 2010 as a result of the “difference between cap reference conditions and current policies and operational rules”.
3. A spill of two thirds of cap credits from storages on the Murray River (note: this has led to more than 8,000GL of water flowing into SA between 2010 and 2018 than would have been the case if users were utilising water at Cap or benchmark levels).



**Figure 2-1: Cumulative difference in Cap modelled and actual flow to South Australia and the cumulative Cap credit from the combined New South Wales and Victorian Murray, Murrumbidgee and Goulburn Cap valleys to 30 June 2018**



This is best summed up by Transition Period Water Take Report 2017/18 summary finding No 5:

*An analysis of the increase in cumulative Cap credits across the Basin since 2009-10 suggests that this is largely a result of the degree of difference between Cap model reference conditions (generally set at the 1993-94 level of development) and current water sharing policies and operational rules. The effect of these differences was masked during the millennium drought however have been revealed more clearly through several wet years since 2010-11. In the New South Wales/Victorian Murray, two thirds of the cumulative Cap credits have spilled from storage.*

## **2.5 NSW REVIEW OF LONG-TERM YIELDS IN THE MURRAY AND MURRUMBIDGEE**

The NSW Government appears to be pre-empting the changes in use observed by reducing the utilisation, LTAAY or *average use* figures for a number of key entitlement products throughout NSW. This is important because it may reinforce or embed a number of inequities into new water sharing arrangements, thus in some cases the changes seem counter to actual observed use patterns.

In May 2018 NSW DPI published new Cap Factors for a number of key NSW entitlement products, which reduced the expected long term expected average yield, or “factors for water recovery” for NSW Murray and Murrumbidgee General Security entitlements significantly. The updated and significantly lower factors were based on updated “planning assumptions”.

For NSW Murray GS Cap Factor (or measure of average utilisation of water, the basis of water recovery assumptions for the Commonwealth) from 81% to 69.9%, and the Murrumbidgee Cap Factor from 64% to 59.1%. Actual nine year av-announced end of season allocations (not use) in the nine years from 2009 to 2018 were 74.3% for the NSW Murray GS and 71.1% for the Murrumbidgee GS.

For Victorian LRWS the cap factor (or Long-term Average Annual Yield or Long-term diversion limit equivalence) for the Murray LRWS is deemed by the Commonwealth as 37.1% and for The Goulburn is 54.1%. There has been no Goulburn LRWS allocated since 1998 and only a single 5% allocation in 2016/17 of Victorian Murray LRWS. This was the only allocation of Murray LRWS since 2006. There were positive changes in the NSW Murray and Murrumbidgee Supplementary license “factors”, once regarded by many NSW irrigators as being very low yielding, likely to be abolished, and of very low value.

Interestingly in Victoria, where the Low Reliability Water Share (LRWS) was once a valuable contributor to annual water availability for many irrigators, no review was conducted. There has been no allocation of Victorian Goulburn LRWS in the last ten years and one allocation of Victorian Murray LRWS (of only 5%) since 2009. LRWS in Victoria is now almost exclusively used and valued as an ‘un-spillable’ carry over vehicle. Realistically owners of Victorian LRWS do not expect an allocation in all however the most unusual type of season.

Despite some consultation in NSW, there has been little comment from users about these changes. This includes the Commonwealth Environmental Water Holder, with large volumes of both Vic, LRWS and NSW GS water entitlements in the three valleys. RMCG believes most of the reported underuse of available water in the Southern Murray Darling Basin since 2010, which has led to the large cap credits, is attributable to the changes in allocation and underuse of NSW Murray and Murrumbidgee GS and Victorian LRWS.

If the change from the 2011 cap factors are implemented in the transition to SDL’s then this will entrench the underuse without any recognition to irrigators of the change. It will effectively further reduce the SDL in each valley.

***The actions of NSW in changing the LTAAY has serious ramifications for transitioning to SDL’s in a fair and equitable manner that reflects the underuse findings of the report.***



## 2.6 TRANSITION PERIOD REPORT AND ENVIRONMENTAL WATER

Most importantly, the work done by the MDBA in assessing water user behaviour recognises and adjusts usage to account for water held by the environment. The report 'uses current methods agreed with Basin States for the adjustment of annual Cap targets in recognition of environmental water recovery'<sup>1</sup>. This is an important consideration, as at June 30, an estimated 2,097GL<sup>2</sup> of water was held by the combined Government agencies. Most of this water is held in the Southern Connected Murray Darling Basin.

The current ownership of more than 2,000GL of water entitlements by environmental agencies, mostly held in the Southern Connected Basin is a critical factor in understanding changes in available water in any season for irrigated agriculture. Environmental water is an important reason that there is less water for irrigation today than would have been available in a repeat of the same season in *The cap* benchmark season of 1993/94.

However, the transition report recognizes this, and adjusts the Cap targets for irrigator use to reflect water recovery.

***Importantly, the underuse and subsequent year after year spills into SA as a result of this multi-season cumulative underuse that is so clearly demonstrated in the Transition Report is not as a result of the change of ownership of water entitlements from irrigators to E-water holders. It is a function of changing allocation policy, carry over behaviour and irrigation choices.***

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<sup>1</sup> *Transition Water Take Report 2017-18*

<sup>2</sup> Pp 18 *Transition Water Take Report 2017-18*

# 3 Factors that have caused the underuse since 2010 (and why they will not go away)

## 3.1 UNDERUSE IS SYSTEMIC

RMCG have reviewed the data and assessed the commentary provided by the MDBA around the underuse recorded. There is view expressed by MDBA that the large cumulative underuse of water by irrigators during the period from 2009/10 to 2017/18 outlined in the *Transition Water Take Report 2017-18* will 'correct itself' and that the likelihood of use by irrigators continuing to be dramatically overestimated by those establishing targets for use will not happen in a future nine year period.

On the contrary, RMCG firmly believes the new reality is that the increased volumes of water in the river, flowing into SA, as a result of dam spills and reduced use of available water is now firmly entrenched and should be recognised as part of the adjustment now occurring. RMCG's analysis indicates this reduction in use in the NSW and Victorian connected MDB is attributable to lower use by NSW General Security (or GS) and Victorian Low Reliability Water Share (or LRWS) users.

***This presents an opportunity for the entrenched lower use of water by irrigators to assist in being recognised as an effective measure to lower diversions (similar to mandating lower allocations, or recovering water for the environmental water holder), and for the subsequent increase in spills into the River system from full storages in wetter seasons to be credited against environmental flow targets.***

## 3.2 IMPACTS OF THE DROUGHT OF RECORD

The 2007/08 Drought in the Southern connected Basin was the worst drought period recorded. As a result, a number of important factors and behaviours changed for all irrigators. RMCG have listed the factors identified and attributed a ranking in terms of the impact on available water for NSW GS users and Victorian LRWS water users. These changes in use and utilisation of allocated water obviously often interact with each other.

1. **Lower allocations, later allocation announcements:** In response to record low inflows recorded, States increased the reserves needed from 2007 onwards to secure future season water for run-of-river and basic human needs. This effectively increased dead storages in all years except a repeat of 2006/07. One important factor often overlooked is that the increased requirement for reserves, and the lower minimum expected inflows (now based on 2006/07) have led to both a lower opening allocation announcement, and later allocation announcements than would have been the case during the benchmark years prior to 1995. For Rice, Corn and Cotton growers the delayed allocation announcements acts to reduce the areas planted, and to reduce in-season water usage, even if ultimately the water becomes available. The fear of a low opening allocation also acts to encourage underuse in the previous season.

2. **Surge in volumes of Irrigator driven carry over:** After the drought, irrigators recognised even secure allocations from High Reliability Entitlement products were at risk and sought to be able to carry over water between seasons as individuals. Most importantly Victoria introduced carry over in 2007 with a range of products and a very high total carry over capacity. Irrigators and water investors in all states have embraced carry over and now strategically and deliberately chose not to use or sell water in one season, in case they need it or can sell it at a premium in the next. Water trades late in the season are no longer driven by irrigation demand, however simply on an analysis of the need to store carry.
3. **Trade and carry over combined:** The volume of water traded between states and valleys has accelerated as barriers to trade have been removed and state agencies have improved and streamlined water transfer arrangements. The proportion of water traded has grown since the drought of 2007, and in some cases the volume traded exceeds the volume allocated each year. Whilst most industry commentators thought increasing water trade opportunities would increase water utilisation for a given volume allocated, one important impact of more trade in allocation was to increase the volume of water being purchased on annual markets to carry over for possible use in a future season. The Transition Report has highlighted that often this water subsequently spilt.
4. **Snowy supplies became less predictable:** In 2006/07 there was also an unprecedented shortfall of the annual commitment by Snowy Hydro to provide 1026 GL to the Murray River and 1062 GL to the Murrumbidgee<sup>3</sup> as part of the Required Annual Release (or RAR). These large and secure volumes had been considered very secure and formed part of the annual base volume available for Southern Basin irrigators in the Murray and Murrumbidgee valleys since Snowy Hydro came online in the 1970's. Since 2007, the RAR has often been compromised and is no longer considered by users and water managers as a certainty. **Impact Moderate** (and difficult to accurately determine).

### 3.3 DELIVERY EFFICIENCY AN ISSUE

**Alleged additional losses:** During 2018 there has been a well-publicised campaign led by Southern NSW irrigators, which may lead to a legal action, criticising the efficiency of water delivery by the MDBA and other agencies whilst operating the Murray River. The claimants believe the extra losses through poor water delivery by the MDBA was a key factor in the 2018/19 zero allocation for GS water entitlement holders in the NSW Murray.

The largest volume of water recovery has been from the large traditional irrigation areas, The Goulburn Murray Irrigation District (Vic) and the Coleambally Irrigation Area (CICL), The Murrumbidgee Irrigation Ltd (the MIA) and Murray Irrigation Ltd in NSW. These large scheme areas divert from the Murray, Goulburn and the Murrumbidgee at diversion points close to the storage dams.

As downstream horticultural developments mature, and E-water recovery is finalised, an increased proportion of all regulated water supplies in the southern connected basin will continue to be diverted further down the Murray River for use downstream of the natural choke in the Murray. Therefore the proportion of water lost (or spilt) to water delivered will inevitably grow, as the median 'kilometres of river per ML delivered' continues to grow.

Rather than learning from the successful and cooperative river operations emergency measures implemented in 2007/08 when loss levels fell significantly and improving as new management technologies are introduced, river loss levels appear to be growing, thus reducing water available to be allocated to users.

There may be an opportunity to recognise deliveries of water that end up as system losses as environmental flows, particularly if the spills are occurring into recognised wetlands such as the Barmah/Millewa forest at times that assist environmental outcomes.

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<sup>3</sup> As modified by the recovery volumes for the Snowy river

### 3.4 HIGHER UTILISATION OF HIGHER SECURITY PRODUCTS (NSW)

1. **High security utilisation:** The annual use of the very reliable 170GL of NSW Murray and 407GL of NSW Murrumbidgee High Security water allocations were traditionally underused. Historically, this underused water remained in storage for re-allocation in a following year<sup>4</sup>. This historic under use by owners of NSW HS water allocations is now systematically used or transferred to a Victorian or NSW Carry over accounts by its owners, who are keen to maintain access to every ML allocated. The underuse of NSW High Security allocations so prevalent in the 1990's, is no longer part of the shared available water at the start of each season. It is a contributing factor to lower opening GS allocations, relative to the 1995 benchmark.
2. **Composite products:** As a result of the rapidly escalating price of High Security water entitlements, a number of irrigators have sought to 'create' a high security water 'product by purchasing a large volume of NSW GS entitlements, and utilising carry over to make sure future irrigation demand can be met. RMCG notes that although Victorian irrigators in the Murray and the Goulburn utilise a large proportion of available allocations of Murray and Goulburn HRWS, they still carry over significant volumes of water. This carry over is prioritised to be carried over on Victorian LRWS entitlements when capacity is available, which have proven to be almost 'unspillable'. Much of the water carried over since 2008 comes from interstate trades of allocation, from NSW & SA. Recent carry over data indicates a large proportion of this water will remain in storages in all even the driest of sequences.

### 3.5 RESERVE POLICIES

1. **Conservative reserves increase spills:** State Governments and the MDBA were all shocked into action to review reserves policy and water reserve management after the 2007 drought. During the worst of this period of record low monthly and whole year inflows, fears grew that water for human consumption in a number of towns, including Adelaide, may not be able to be supplied if drought conditions continued.

One response since this period has been the far greater focus on making sure reserves are held between seasons to enable minimum flows to be maintained to meet basic human needs, in almost all circumstances. This has led to a more cautious reserves policy in almost every State, which effectively increases the volume stored between seasons and reduces the amount of water available for irrigators.

The progressive introduction of carry over since the early 2000's in NSW and in Victoria in 2007 has made the need for state reserves even more acute, as water managers can no longer assume even modest levels of irrigators water underuse returning into the 'pool' at the end of each season.

### 3.6 OTHER FACTORS

There are a wide range of other factors which may be leading to lower water use by irrigators. These include:

1. **Climate change:** Although the data prepared by the MDBA has been adjusted for seasonal variation, it is likely the model uses whole season water availability. Consistently lower Spring and Autumn rainfall may be distorting irrigation demand and limiting irrigators capacity to utilize available water during key irrigation periods.

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<sup>4</sup> As a large proportion of this water was held within MI's bulk water account, actual past utilization is difficult to determine.

2. **Less Water coming down the Darling:** In better resource years it is now likely water available from this once small yet important source has reduced. As well as increased capacity to divert water by northern irrigators, the reduction in maximum capacity in the Menindee System since the mid 1990's has also reduced its capacity to contribute to regulated Murray flows and NSW Murray allocations. (Prior to 1996 Menindee was able to be surcharged to more than 2,200GL, full capacity now is 1,731GL).
3. **Changes in commodity prices, crop yields:** Normal agricultural commodity and input cost factors also drive water use, farmer risk appetite and trade in water. Clearly since benchmark conditions were established in 1995 there have been very significant changes in crop types, yields per ML and prices for commodities. The collapse of milk prices in Victoria in 2016 and the introduction of cotton into the Murrumbidgee Valley in the early 2000's, two significant examples of 'other factors' that have led to not only led to more efficient water use by irrigators, however also changes in water demand and even water entitlement ownership.
4. **Conveyance water not 100% secure:** In Victoria the water to fill and operate the State owned GMW's extensive 6000km channel system is given absolute water allocation priority. In the NSW Murray and Murrumbidgee the allocation of conveyance water to the large irrigation corporations occurs only after more than 95% of High Security water is available. For many investors and water users even the *possible* inability to have water delivered in an extreme drought, is a recognised hurdle to investing and may be another factor leading to water entitlements and annual allocations leaving the recognised NSW irrigation districts, particularly in the NSW Murray Irrigation Area.

### 3.7 THE IMPACT OF UNDERUSE

The beneficiaries of the year on year underuse by irrigators, mainly irrigators depending on NSW General Security, or Victorian Low Reliability (LRWS) water allocations, are:

- Environment, (or simply SA water quality) from even greater than mandated flows over the border into SA (1000GL/annum)
- High Security water holders with enhanced relative security of supply (and value of entitlements) despite the increased utilisation of the available allocations in their accounts
- Horticulture/dairy users dependent on using actual NSW General Security allocations, which have been purchased in prior seasons, and converted through carry over against a Victorian Murray or Goulburn LRWS into a higher secure product through interstate trade and the use of carry over.

It is considered that although some of the irrigator behaviours are simply market based and reflect sensible risk management by both buyers and sellers involved, some of the behaviours (policy changes) and outcomes observed fail the NWI principles of "no third party impacts" as policy decisions appear to favor allocation or access of water to one group over another.

The systemic lower use per ML allocated, the policies that set lower allocations for some users and the practices that prioritise some users unfairly all require action by both State and Federal Governments to acknowledge and/or redress the industry impacts, the quite dramatic over shooting of each key valley's design use limitations or *1995 Cap*, and the issues of NWI non-compliance.

# 4 What are the numbers

## 4.1 OVERVIEW AND RMCG ESTIMATE

Since the drought in mid 2,000's (since 2009/10) annual yield or usage, of water allocations from Entitlements held in the Southern MDB by NSW General Security users and Victorian Low Reliability Water Share Users deteriorated 58% or 2,000GL compared to the calculated long term average yield on these two large categories of water entitlements. The allocations from these two products were key drivers of rice production in NSW and Dairy feed production systems in Northern Victoria.

Whilst the water recovery program for State and Commonwealth Environmental water and the higher incidence of drought years have contributed to the deterioration, the impact is much greater than just these factors alone.

Recent cap data and analysis suggest that there has been considerable underuse (1,200GL/year) of available water compared to the agreed cap (after considering drought and water recovery) resulting in extra river losses, increased dam-spills and increased Murray river flows (an increase of 1,000GL/year) to SA.

This overall cap underuse is attributable to policy changes, the introduction of carryover and water management shifts. Carry over became very firmly entrenched when introduced by Victoria in 2007.

This result during the nine water years up to June 2018, when combined with substantial water recovery and drought, means only 42% (1,415GL) of the GS/LS water was allocated and is utilised by irrigators now compared to pre 2004 allocation and use practice of 3,388GL. From NSW GS entitlement holder's perspective their use has declined to 46% and from Victoria LS perspective the decline in use has been absolute i.e. almost zero.

This finding is supported by:

- The MDBA *Transition Water Take Report 2017-18*
- A comparison of entitlements and modelled yield held by irrigators in 1997 with actual entitlements and allocations held between the nine years, 2009/10 and 2017/18
- Water recovery volumes by the environment are on the public record and incorporated in a detailed analysis in the *Transition Water Take Report 2017-18*
- RMCG have referred to industry, regional water authority data, NSW Irrigation company annual returns, and ABS data on the actual water use by the various irrigated crops over this period (rice/grazing/cereals/maize/cotton).

## 4.2 BASIS FOR ESTIMATION OF THE REDUCTION IN USE

Over the last nine years there has been 2,000GL less available to GS/LS users (compared to the *1995 Cap agreement*, the basis of NSW Water Sharing Plans and the SDL's). RMCG have attempted to attribute the reduction to assist in identifying the relative contributions to this change in water use. It is noted that whilst the individual components will vary with different analysis the overall total change of 2,000GL is confirmed by reconciling with the transition report.

The following shows the basis for the 2,000GL estimate.

#### 4.2.1 HISTORIC YIELD

The **historic yield** for GS/LRWS/Supp water is based on Long-term Average Annual Yield (LTAAY) of 3,388GL (i.e. The combined 1995 Cap levels for these key products).

Total NSW GS + Vic LRWS entitlements on issue was 4,277GL entitlements with conversions to LTAAY of:

- Victorian Murray and Goulburn  
av LRWS @43% = 713GL
  - NSW Murray @81% = 1,354GL
  - NSW Murrumbidgee GS @ 64% = 1,211GL
- add, in NSW some access to the *supplementary* and *uncontrolled* flows (say 110GL), however only in wetter years.
- = a total of **3,388GL** expected average yield or total use each year from these key products.

#### 4.2.2 ESTIMATING THE ACTUAL INDUSTRY USE

**RMCG have utilised** Industry data, ABS data and Water Corporation data to estimate that the average annual water use by non-hort' and non-irrigated dairy users, although varying significantly, has averaged over the last nine years approximately:

- Rice production – 600GL
- Cereal/Maize cropping – 300GL
- Irrigated pasture for Livestock NSW Murray and M'Bidgee – 200GL
- Cotton (also uses some Murrumbidgee HS and Groundwater) approx. 300GL.

RMCG's industry reconciliation indicates a total average consumption of 1,400GL p.a.

Note in total Southern Basin there are 500GL of Ground Water available and used in drier years.

This is documented in RMCG's report for GMID Leadership group which was updated for the Goulburn Broken CMA 2018 and also in a recent publication: [It's not all about almonds](#)" Rob Rendell. Background on issues affecting the "Connected Murray" system, August 2019.

**Therefore, this water use suggests that the total reduction in water use is 2,000GL.**

### 4.3 KEY ELEMENTS OF 2,000GL REDUCTION

#### 4.3.1 WATER RECOVERY – 775GL

The total combined recovery from the Victorian LRWS and the NSW GS in the Southern MDB was 775GL (LTAAY. @ May 2019).

#### 4.3.2 REDUCTIONS IN ALLOCATIONS – 598GL

Applying the actual announced allocations in the two states over nine years between 2009/10 and 2017/18 to the pre basin plan entitlements indicates that the volume allocated would have been 2,015GL i.e. a reduction of 1,373GL.

This total reduction in actual volumes allocated of 1,373GL comprises 775GL from water recovery leaving the **net reduction in irrigation water use due to allocations being less than historic is 598GL**.

The reduction in use due to lower allocations of 598GL comprises an estimated 150GL due to climate (reduces allocations 5%), 50GL due to extra losses 398GL due to policy changes (which reduces allocations by 12%).

For further detail regarding the basis of this attribution of reductions, refer to the Table in Appendix 2.

#### 4.3.3 CARRYOVER SPILLS TO SA – 450GL

The additional spills into SA are the result of both carryover increasing spills and policy changes that reduce allocations and increase spills. Some of the spills are due to the environmental agency carryover too.

The transition report identified that the total underuse was approx. 1,100GL per annum and that the increased flows to SA were 1,000GL.

Apportioning the impact of carryover to the increased flows to SA is an inexact calculation even through iterative approach it is suggested that the **irrigator carryover impact is approx. 450-500GL**, 250GL are due to reduced allocations that have spilt and 250GL due to the environment.

#### 4.3.4 GS WATER CONVERTED TO HORTICULTURE USE – 150GL

There has been a net trade from the Murrumbidgee and Murray systems to Victoria over the nine year period of approx. 40GL per annum. In addition, there has been a net trade from the NSW GS to NSW Murray Horticulture. The volume can only be guessed at, it suggested could be of the order of 50-150GL p.a.

**This suggests that NSW GS water is being converted to Horticulture with the use of carryover provisions in Victoria and NSW Murray of 100-200GL.**

### 4.4 ESTIMATING THE INDIVIDUAL REDUCTION COMPONENTS

*The following table summarises the component reduction of the 2,000GL underuse.*

**Starting** with a historic yield for GS/LS/Supp water based on LTAAY of **3,388GL** ('97 cap).

**Lost on average 2,000GL/year** over the last nine years due to:

- **775GL – Water recovery** since '97 from these pools – (LTAAY. @ May 2019) (Living Murray, buyback, farm efficiency, 80/20 etc.)
- **598GL – Reduced allocations** announced by NSW and Victoria – total comprising
  - *Dry period* (150GL), 83% average inflows in the nine years between 2009/10-2017/18 (although five seasons in the nine years after the 2009/10 season had 100% allocations in the NSW Murray GS)
  - Extra allowance for delivery losses (50GL), by:
    - Increased downstream flows for environment
    - Changing operations including spills from Lake Victoria (50GL)
  - Policy changes (398GL) that:
    - a. Prioritise HS over GS/LRWS water to HS(98GL)
    - b. Prioritising conveyance allocations to deliver carryover

- c. Trade and carryover reducing underuse of HS
  - d. Increase spills (250GL)
  - e. By adopting higher reserves (06/07 inflows)
  - f. Reduce max allocations
  - g. Victorian decision to prioritise Carryover over LRWS allocations
  - h. Snowy releases in wet periods
  - i. Barmah/Millewa spills
  - j. Enabled Darling river contributions to reduce (50GL)
- 600GL – Irrigator carryover impact – comprising
    - Private spills, accumulated dead storage, (450GL)
    - Horticulture/dairy turned water into reliable product used (included) 150GL.

**What's left on average for GS/LRWS users** in Victoria/NSW (SCB) =1,415GL (42%) for growers of rice, pastures, irrigated cereals/maize, cotton etc.

*Note this is an approximate split even the total lost, however the Transition Report confirms the volume is definitely of the order of 2,000GL.*

- People will argue with the split however let's start the debate with acknowledging the big change
- If one increases the loss due to dry period, then other components of reduced allocations must correspondingly reduce.

A visual explanation of the changes in allocation policy along with impacts of the changes has been included as Appendix 3.

## 5 Basis for action related to fairness— inequities have arisen

The reduction in water use has been a combination of climate, water recovery, the use of carryover and policies that reduce allocations. The beneficiaries of the year on year reduced allocation levels to NSW GS and the virtual abolition of Victorian LRWS allocations have been:

- The environment from even greater flows into SA in most years. This has averaged 1,000GL/annum in the nine years up to 2018. This is a large annual volume.
- High Security holders in all States, with enhanced or maintained security *with volume available* despite the dryer climate, thus increased utilisation of their announced allocations each year.
- Horticulture/dairy users in all States who are, through water market activity and carry over, converting NSW GS water into a more secure product.

It is considered that some of the State allocation policies that have delivered this outcome fails the NWI principles of “no third-party impacts” of policy decisions. Therefore, this analysis suggests that a number of inequities have arisen.

1. Horticultural irrigators have increased water use (offsetting particularly the reduced Victorian Torrumbarry ID use) thus maintaining total downstream of choke river irrigation demand with associated environmental impacts yet upstream irrigators have given up the greatest proportion of the water.

There is emerging evidence of difficulty delivering both irrigators water and environment demand to the lower reaches of the Murray River.

2. NSW water sharing commitment to share the pain of water recovery between user types has not been honoured:
  - The maintenance of the High Security NSW product, and NSW (and by transfer Victorian Carry over) has been, in part at the expense of reducing water available for the supply of NSW GS/Victorian LS/supplementary access/Corporation conveyance in NSW
  - Water recovery to E-Water accounts has been dominated by sale of water from GS users providing water to buy-back and infrastructure recovery programs in NSW – virtually no NSW HS has been recovered
  - Upper Darling water has stopped flowing into Menindee for extended periods, and the northern NSW and SE Queensland rivers are not delivering their pre 1995 share of flows into the Murray. This is a result of both drought and the alleged regulatory failure in managing extractions from the key tributaries to the Darling River.
3. NWI principles are for water management, water sharing policies and E-water management to have no third-party impacts. However, significant third-party impacts have occurred as a result of:
  - Carryover rules prioritised carryover above entitlement holder’s rights to allocations from inflows
  - Victoria is using its carryover to also store NSW GS in many recent seasons, converting it into a higher reliability product. This has been encouraged by Victorian spill rules that secure carry over water, and then prioritise carryover relative to a LRWS allocation announcement when it is stored.
  - Most environmental water released from storages is ultimately delivered into SA. This delivery incurs higher delivery losses that are not debited. Formalisation of E-Water Shepherding in the NSW Murray and Murrumbidgee to enable multiple uses of E Water releases will exacerbate this therefore have the

potential to further limit access by irrigators to flows previously declared as *uncontrolled or supplementary*.

- Previous rules (Barmah/Millewa allocation or B-MEWA, Lake Victoria spill and prescribed minimum monthly flow to SA) have not adapted to being flooded by E-Water. Some of these rules are now fifty years old and will be very difficult to amend.
- Snowy River release patterns impacts may be making boom and bust cycles worse (i.e. SHL high release rates concentrated on wetter years). SHL's current and proposed release operations need to be better understood.

Key points regarding the extra water into SA:

1. The environment gets extra spills into SA that are most valuable for environmental outcomes, (Higher and longer flood events occur in wet periods also are not subject to constraint limitations applied to those caused by man-made flooding), i.e. more water is now stored at any time. This effectively creates a dead storage therefore makes the dams spill more often.
2. Transition from cap accounting to SDL (1 July 2019) may entrench the inequities/underuse that have developed between the policy changes since 1995, the finalisation of water Sharing Plans in 2004 and now into Commonwealth endorsed Water Resource Plans. These factors have possibly caused a re-setting of each valley's water access rules and therefore use levels, at new, much lower, annual levels.

## 6 Proposed Actions - What needs to be done

The *Transition Report* provides compelling evidence that water allocation policies, together with water user behaviour are combining to reduce available water for irrigators and to increase the volume of E-Water available each year.

### Immediate actions recommended:

1. **Recognise the savings:** A lot has changed since the cap was introduced based on 1995 Diversions for irrigation. There is clearly an opportunity to recognise the measures that have led to this entrenched and recognised extra flow into SA and underuse by irrigators as a water recovery action, and to reduce, or even eliminate the need to pursue the 450GL of up-water. (The higher flows could also be used to reduce the minimum monthly mandated flow requirement into SA, originally designed to counter high salinity, that now serves little purpose and seems counter to natural flow cues).
2. **Allocate more water in better years:** State allocation policy within the NSW Murray and Murrumbidgee Water Sharing Plans could also be adjusted to enable more access to water in better resource seasons, to enable increased irrigated production. Even with adjustment, water use by irrigators in NSW will remain well below the Sustainable Diversion Limit.
3. **Adjust sharing and carry over policy within NSW and VIC:** Some of the changes to policy and revised entitlement characteristics by State Agencies appear to contravene a number of the agreed the 2004 National Water Initiative principles. It is worth considering some modest adjustments within NSW water sharing to make water access fairer between user-groups. It is also worth considering changes to Victorian carryover spill rules, to enable actual allocation announcements of LRWS in better seasons.
4. **Stop any transitions to SDL:** Compliant Water Resource Plans (WRP's) and associated state sharing principles that entrench entitlement-owner inequities associated with underuse until this matter of high underuse of available water is recognised and resolved fairly.

### Further measures that would enable greater use of available water by NSW GS and Victorian LRWS owners:

5. Limit expansion in Horticultural developments that further increase in horticultural demand in SA and the NSW/VIC Lower Murray until full consideration of the impact on environment, additional losses and deliverability is accounted for.
6. Assess losses in delivering E-Water recognising any spills are likely to create an environmental benefit. Debit these losses to E-Water accounts.
7. Improve efficiency of river operations in line with improvements observed within all irrigation supply corporations in NSW and Victoria. Credit savings to all entitlement holders.
8. Reconsider water sharing and special entitlements related to salinity management, and design better environmental flows accordingly. The flushing of salts in the greater Murray system is effectively a battle that has been won.
9. Reconsider the structure and use of the Barmah Millewa water account. This watering regime has effectively been swamped by the environmental water entitlements created as a result of the Basin Plan.
10. NSW should align the priority of NSW conveyance loss allowances for the NSW irrigation corporations. With High Security allocations, not after full High Security allocations have been announced.

### Other actions that also could be considered:

11. Snowy River flow & release management should be subject to an independent review to avoid a bias towards wet year releases that may lead to future reductions in the Required Annual Release. (The RAR).
12. Regardless of the reconfiguration, the Upper Darling tributaries in NSW and QLD<sup>5</sup> need to contribute more water into the Lower Darling and the Murray in accord with the NSW commitment to actually cap diversions across the whole of NSW at the 1993/4 levels of development.
13. Change the Lake Victoria spill rules – consider debiting any Lake Victoria spills to E-water accounts.

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<sup>5</sup> Queensland later agreed to a cap at 2000 levels of development.



# Appendix 1: The National Water Initiative

The National Water Initiative was agreed between Murray Darling Basin States, Territories and the Federal Governments (COAG) in June 2004. This statement of objectives was part of a comprehensive review.

## The National Water Initiative (CI23)

The NWI sets out a number of specific objectives that, when fully achieved, would have a major impact on water management. Clause 23 of the agreement states that full implementation of the NWI will achieve:

- **effective water planning:** transparent and statutory based water planning that deals with key issues such as the natural variability of water systems, major water interception activities, the interaction between surface water and groundwater systems, and the provision of water to achieve specific environmental outcomes
- **clear, nationally compatible and secure water access entitlements:** providing more confidence for those investing in the water industry through more secure water entitlements; better and more compatible registry arrangements; better monitoring, reporting and accounting; and improved public access to information
- **conjunctive management of surface water and groundwater resources:** so that the connectivity between the two is recognised, and connected systems are managed in an integrated manner
- **resolution of over allocation and overuse:** returning over allocated systems to sustainable levels of extraction as quickly as possible
- **clear assignment of the risks associated with changes in future water availability:** ensuring that the risks arising from reductions in the pool of water available for consumptive use are shared between Governments and water users according to an agreed framework, to provide investors and entitlement holders with certainty about how changes will be dealt with
- **effective water accounting:** providing information on how much water there is, where it is, who has control of it, who is using it, and what it is being used for in order to support confidence about the amount of water being delivered, traded, extracted and managed for environmental and other public benefits
- **open water markets:** removing artificial barriers to trading in water entitlements and allocations, bringing about more productive water use and enabling more cost effective and flexible recovery of water to achieve economic, social and environmental objectives
- **effective structural adjustment:** ensuring that water policy, planning and management are facilitating and expediting adjustment, rather than impeding it.

These actions, taken together, would achieve:

- Economically efficient water use and related investment that maximise the economic, social and environmental value of Australia's water resources
- Improved environmental water outcomes, including the identification and effective and efficient delivery of water to sustain the health of water-dependent ecosystems of waterways and wetlands.

## Figure A1-1: Principals of The National Water Initiative 2004

RMCG has reviewed the Transitional Water Take Report for 2017-18 published in July 2019. Combined with other independently sourced data related to water use, water allocations, water trading and water stored in reserves, there is compelling evidence that the objectives of the NWI are clearly not being met. Furthermore, some elements of the current Murray Darling Basin Plan are in need of immediate review and adjustment to avoid embedding unfairness in State water allocation practice, paralysis of large user groups, stranded assets, and continuing large annual over recovery of flows relative to recovery targets.

It is now likely the economic benefits of trading water to its highest use (or value) may be counter to a successful balance between the best possible environmental outcomes, equity between user groups and community wellbeing.

## Appendix 2: Calculation of allocations

**Table A2-1: Southern Murray Darling Basin allocations: nine years to June 2018 (Sources various)**

	Entitlements on issue	LTAAY 2011 factors	Total Historic yield	Environmental water	Historic Environment yield	current Irrigator entitlements	Actual av allocation 09/10 - 17/18	Av actual irrigator water
NSW Murray GS	1672	81%	1,354	370	299.7	1302	66.90%	871
NSW Murray Supp	250	73%	183	111	81.03	139	15%	21
NSW M'Bidgee GS	1892	64%	1,211	282	180.48	1610	64.70%	1,042
NSW M'Bidgee Supp	199	14%	28	22	3.08	177	15.00%	27
Low Bidgee NC1	393	45%	177	393	176.85	0		-
Low BidgeeRBN2	1	34%	0	0	0	1		-
Low BidgeeRBS3	354	34%	120	0	0	354	15.00%	53
Vic Murray LRWS	300	43%	129	35	15.05	265	0.50%	1
Vic Goulburn LRWS	413	45%	186	42	18.9	371	0%	-
	5474		3,388	1,255	775	4219		2,015
		total reduction in irrigator yield	1,373	environment recovery yield	775	means allocation reduction in irrigation yield		598

# Appendix 3: Visual explanation of reduction

The following four Figures below illustrate the change in available GS water since the 1990's:

Water Storage Model for G.S/H.S product

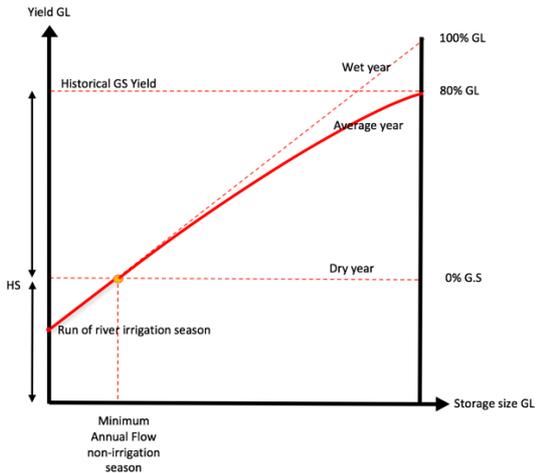


Figure A3-1: Standard Storage/allocation model

Water Storage Model for G.S/H.S product  
Allocation reduction impact

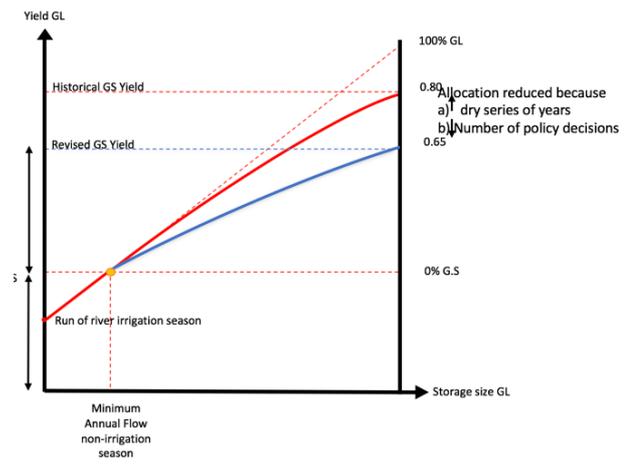


Figure A3-2: Showing impact of reduction in allocations

Water Storage Model for G.S/H.S product  
Allocation reduction impact  
plus  
Impact of minimum carryover

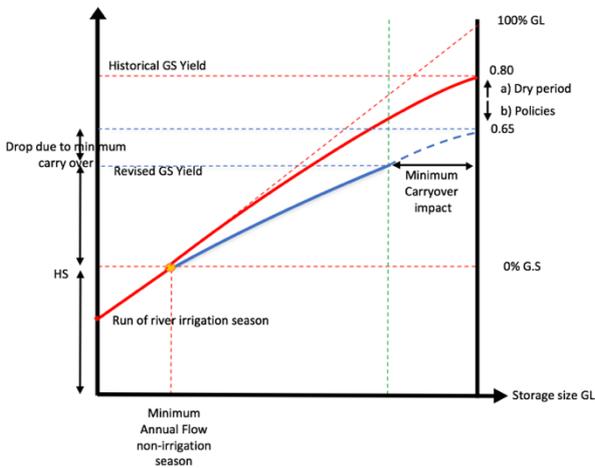


Figure A3-3: Showing the impact of minimum carryover

Water Storage Model for G.S/H.S product  
Allocation reduction/minimum carryover impact  
plus  
Impact of converting carryover to reliable water

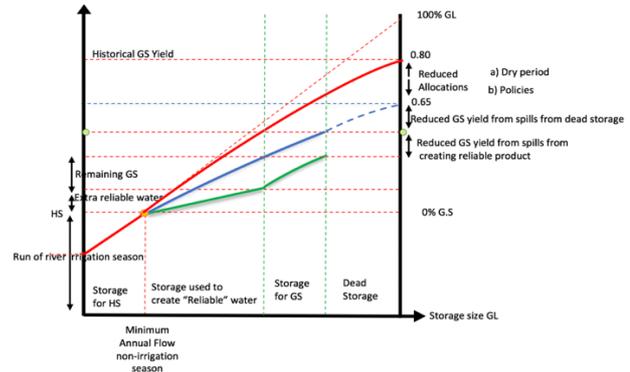


Figure A3-4: Showing the impact of converting carryover to a more secure product

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