# XV World Water Council

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## Blue Gold: How Valuable is Water really? A Case study in Australia

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# Content

- Why are we interested
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# Why are we interested?

- Increasing water scarcity
- Water – Making do with what we have
- Maximize the benefits of available water at all time
- Need mechanisms to move water around between users – water markets
- Mechanisms need to be flexible, liquid and secure

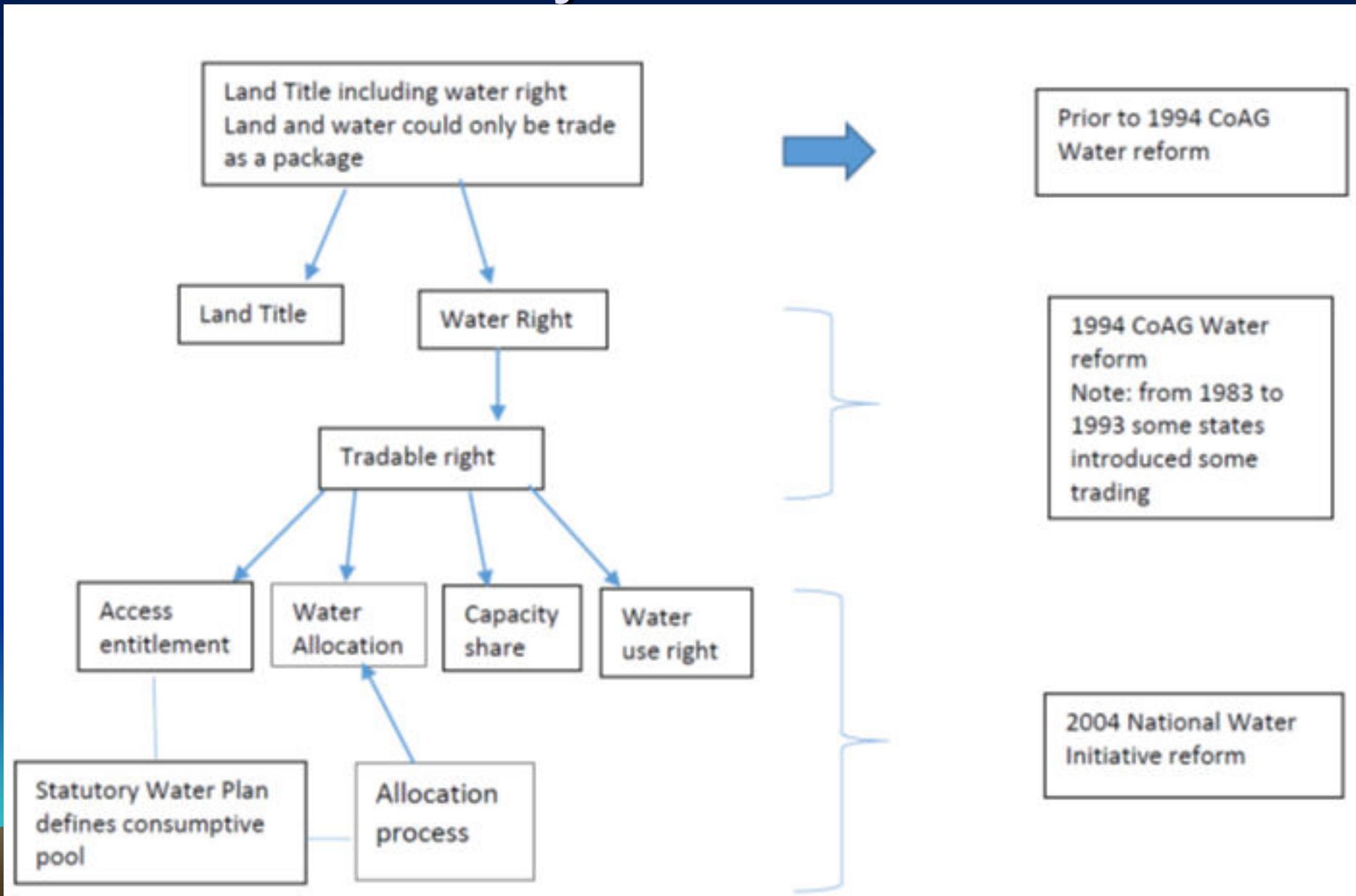
# What are the issues?

- Perception of water as a social good
- Strong opposition from most stakeholders
- Third party impact
- Very complex
- High cost of establishing and implementation
- Jurisdiction need high level of financial, social and institutional capital

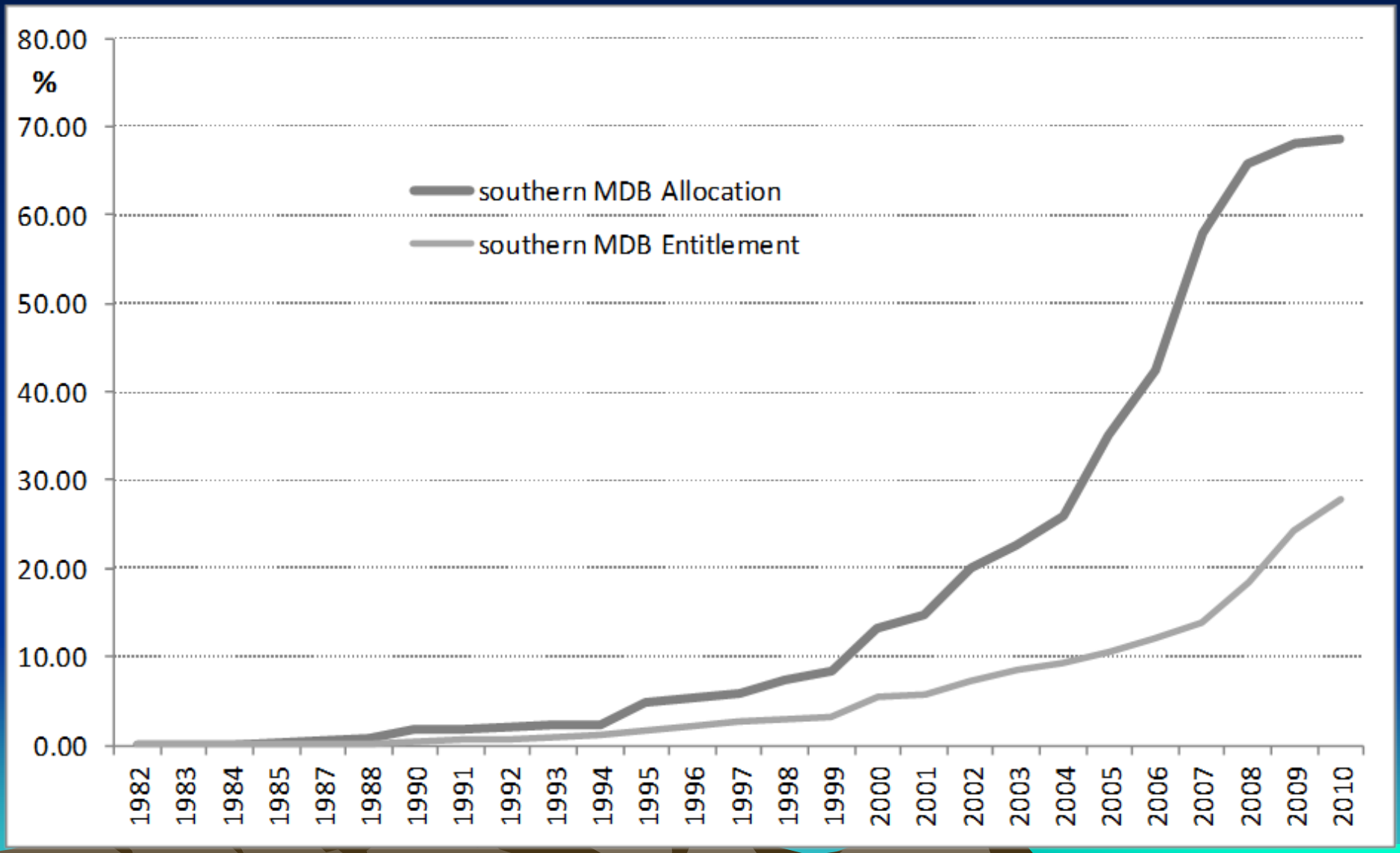
# Why Australia?

- Water market started in mid 1980s
- Market in water entitlement
- Markets in water allocations
- By now markets are very widely used
- Australia has undergone significant water reform to facilitate trading and overcome concern

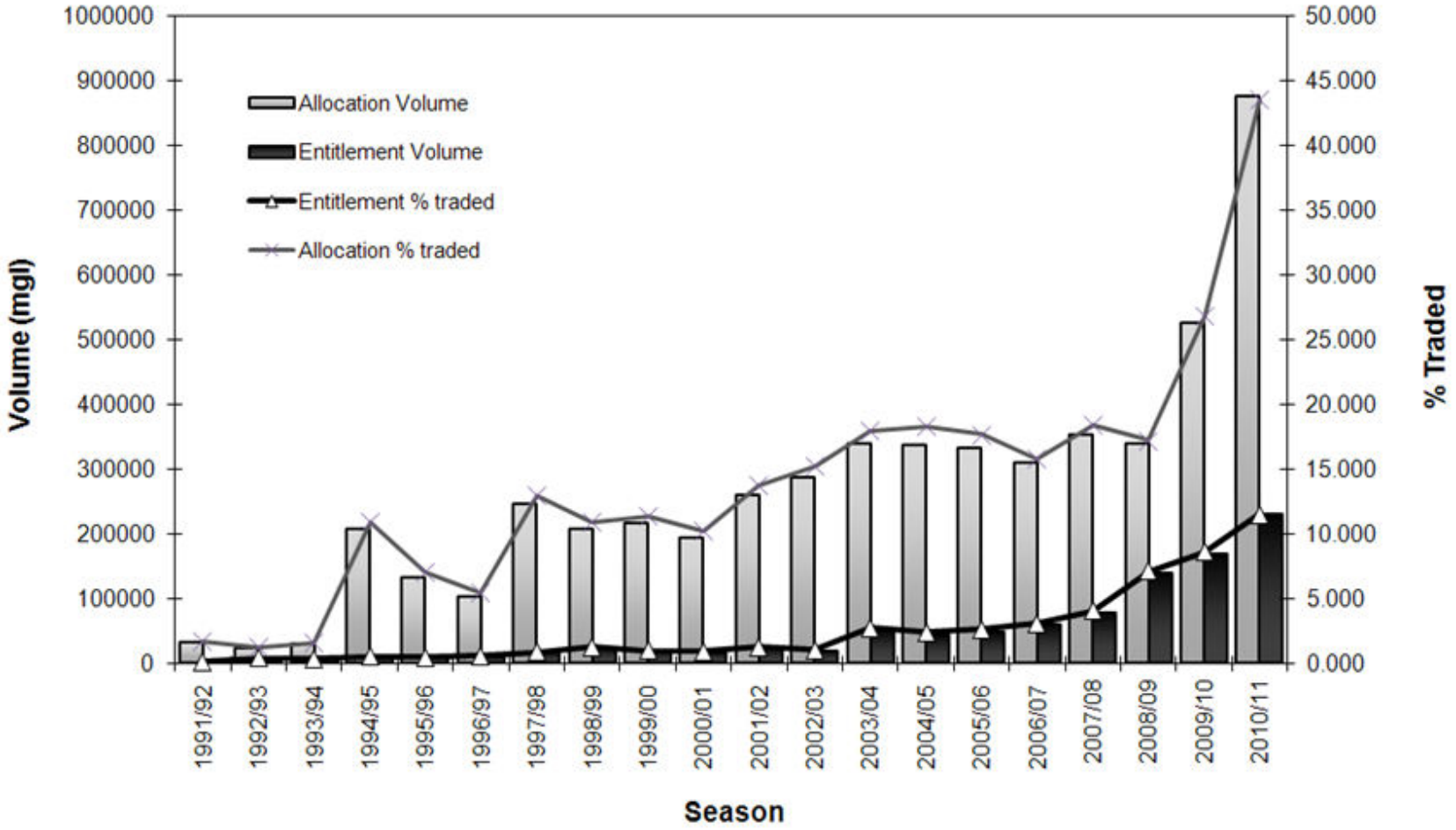
# Why Australia



# Accumulated adoption of water market



# Development of Trading within the GMID 1991 to 2011

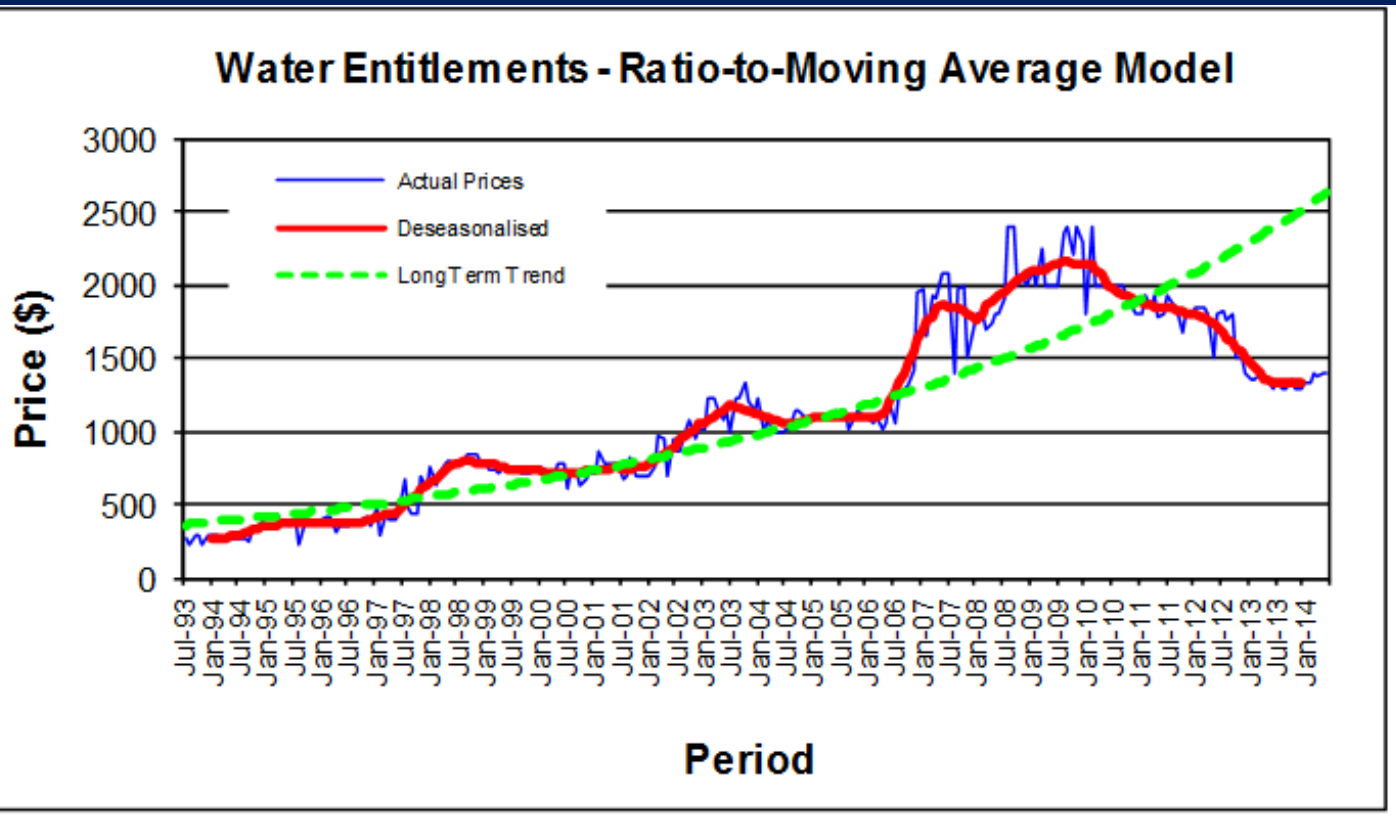



Note to Figure: The percentage traded is computed using the total volume of entitlement at the beginning of each year from July 1991 to June 2006, based on data provided by GMW. This time series was discontinued in 2006 and since July 2006 the entitlement volume is based on the annual report from GMW. In 2007 a policy change allowed district irrigators to separate their water right from the district entitlement to an entitlement held in their own name. Such separations are recorded in GMW annual reports as sales from a district entitlement into a new entitlement category inflating the volume of real transactions. The volumes trade in this figure have been adjusted for this impact by reducing the total amount traded by the net increase in this entitlement category.

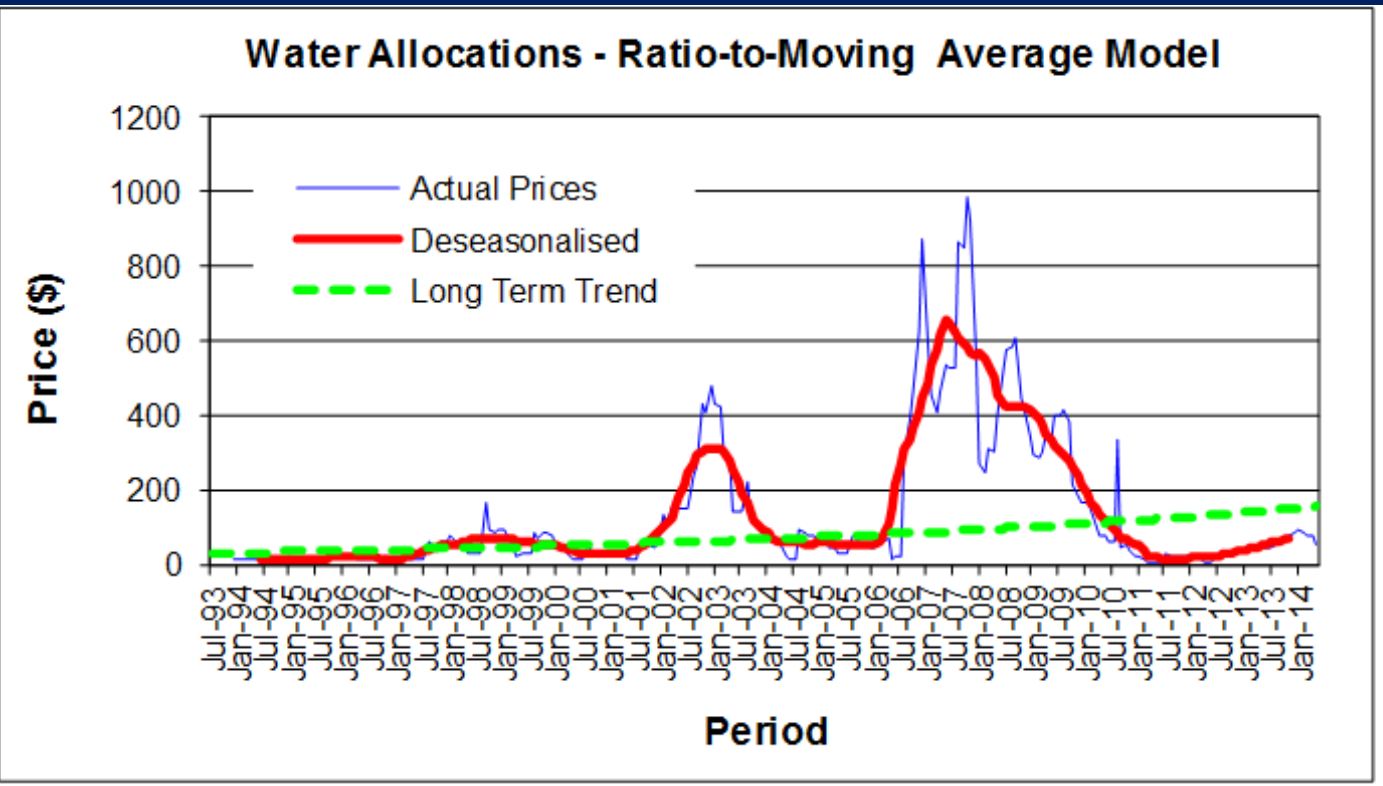
| | Goulburn System | | | Murray System | | |
|---|---|---|---|---|---|---|
| Season | Allocation (%) | | % of trade[1] | Allocation (%) | | % of trade[1] |
| | Opening | Closing | | Opening | Closing | |
| 1995/96 | 150 | 150 | 7 | 150 | 200 | 3 |
| 1996/97 | 200 | 200 | 4 | 200 | 200 | 3 |
| 1997/98 | 120 | 120 | 9 | 130 | 130 | 13 |
| 1998/99 | 40 | 100 | 13 | 95 | 200 | 5 |
| 1999/00 | 35 | 100 | 14 | 100 | 200 | 8 |
| 2000/01 | 48 | 100 | 16 | 200 | 200 | 2 |
| 2001/02 | 55 | 100 | 18 | 200 | 200 | 5 |
| 2002/03 | 34 | 57 | 24 | 129 | 129 | 16 |
| 2003/04 | 0 | 100 | 16 | 18 | 100 | 18 |
| 2004/05 | 0 | 100 | 18 | 42 | 100 | 22 |
| 2005/06 | 0 | 100 | 22 | 82 | 144 | 14 |
| 2006/07 | 0 | 29 | 37 | 76 | 95 | 20 |
| 2007/08 | 0 | 57 | 29 | 0 | 43 | 36 |
| 2008/09 | 0 | 33 | 53 | 0 | 35 | 42 |
| 2009/10 | 0 | 71 | 64 | 0 | 100 | 30 |
| 2010/11 | 0 | 100 | 105 | 0 | 100 | 102 |
| 2011/12 | 48 | 100 | NA | 21 | 100 | NA |

# What did we do and find?

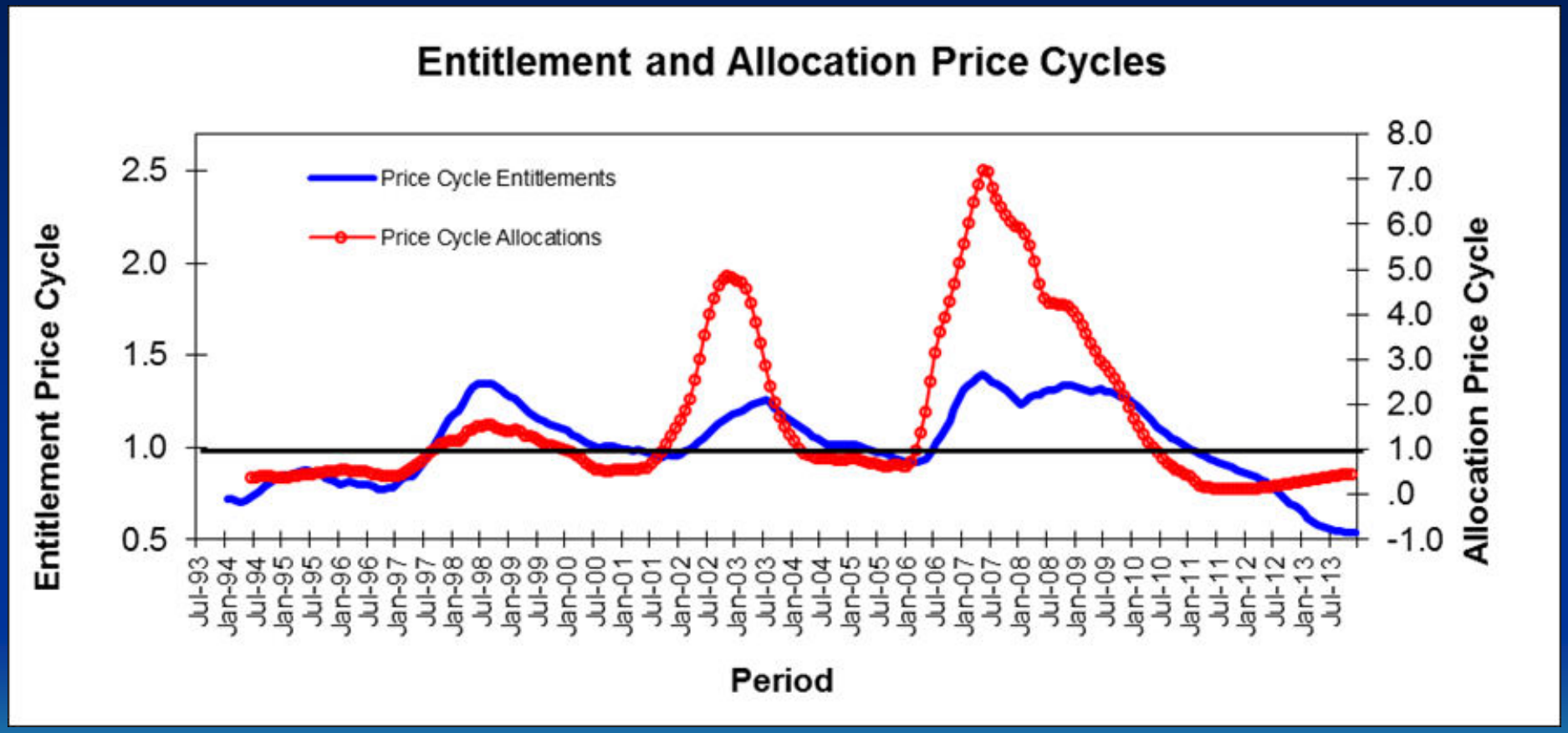
- 22 years of monthly data on prices paid both for entitlements and allocation water
- Time-series analyses to estimate the annual growth rate of allocation prices and entitlements,
- seasonal indices
- price cycles
- Discounted cash flow - calculating the return from investing in water entitlements and selling the allocations over a 5-year investment period
- Comparing with investments in the ASX200
- Covariance between share market and water market – diversification potential




| Monthly Growth | 0.9% |
|---|---|
| Annual Growth | 11.8% |
| **Seasonal Indices** | |
| Jan | 1.03 |
| Feb | 1.01 |
| Mar | 1.03 |
| Apr | 1.00 |
| May | 0.97 |
| Jun | 1.00 |
| Jul | 0.99 |
| Aug | 0.97 |
| Sep | 1.01 |
| Oct | 0.99 |
| Nov | 1.00 |
| Dec | 1.00 |




| Monthly Growth | 1.5% |
|---|---|
| Annual Growth | 20.0% |
| **Seasonal Indices** | |
| Jan | 1.108 |
| Feb | 0.988 |
| Mar | 0.866 |
| Apr | 0.770 |
| May | 0.620 |
| Jun | 0.645 |
| Jul | 0.753 |
| Aug | 1.389 |
| Sep | 1.237 |
| Oct | 1.269 |
| Nov | 1.217 |
| Dec | 1.138 |


Entitlement and Allocation Price Cycles
Price Cycle Entitlements
Price Cycle Allocations
Entitlement Price Cycle
Allocation Price Cycle
Period
2.5
2.0
1.5
1.0
0.5
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
.0
-1.0
Jul-93
Jan-94
Jul-94
Jan-95
Jul-95
Jan-96
Jul-96
Jan-97
Jul-97
Jan-98
Jul-98
Jan-99
Jul-99
Jan-00
Jul-00
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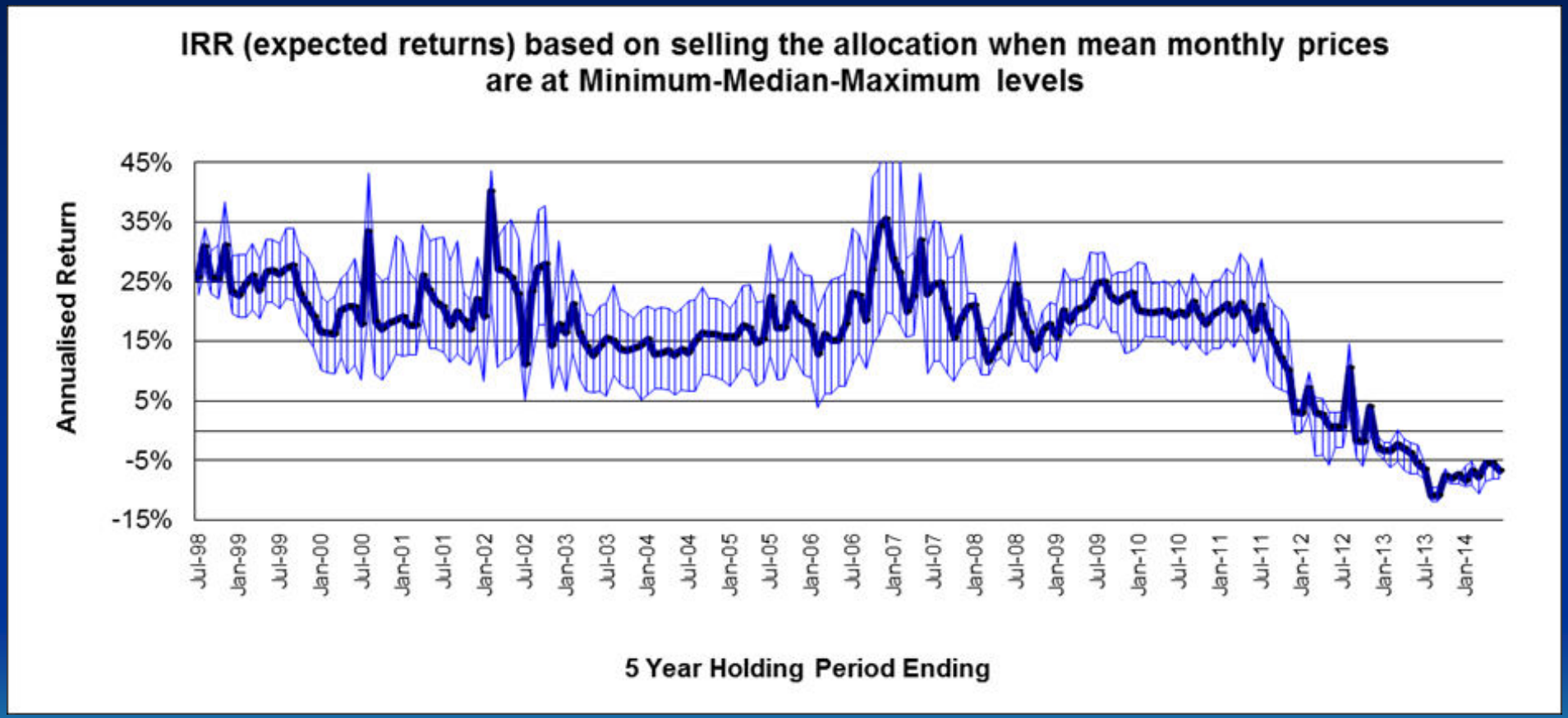
IRR (expected returns) based on selling the allocation when mean monthly prices are at Minimum-Median-Maximum levels
Annualised Return
45%
35%
25%
15%
5%
-5%
-15%
Jul-98
Jan-99
Jul-99
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
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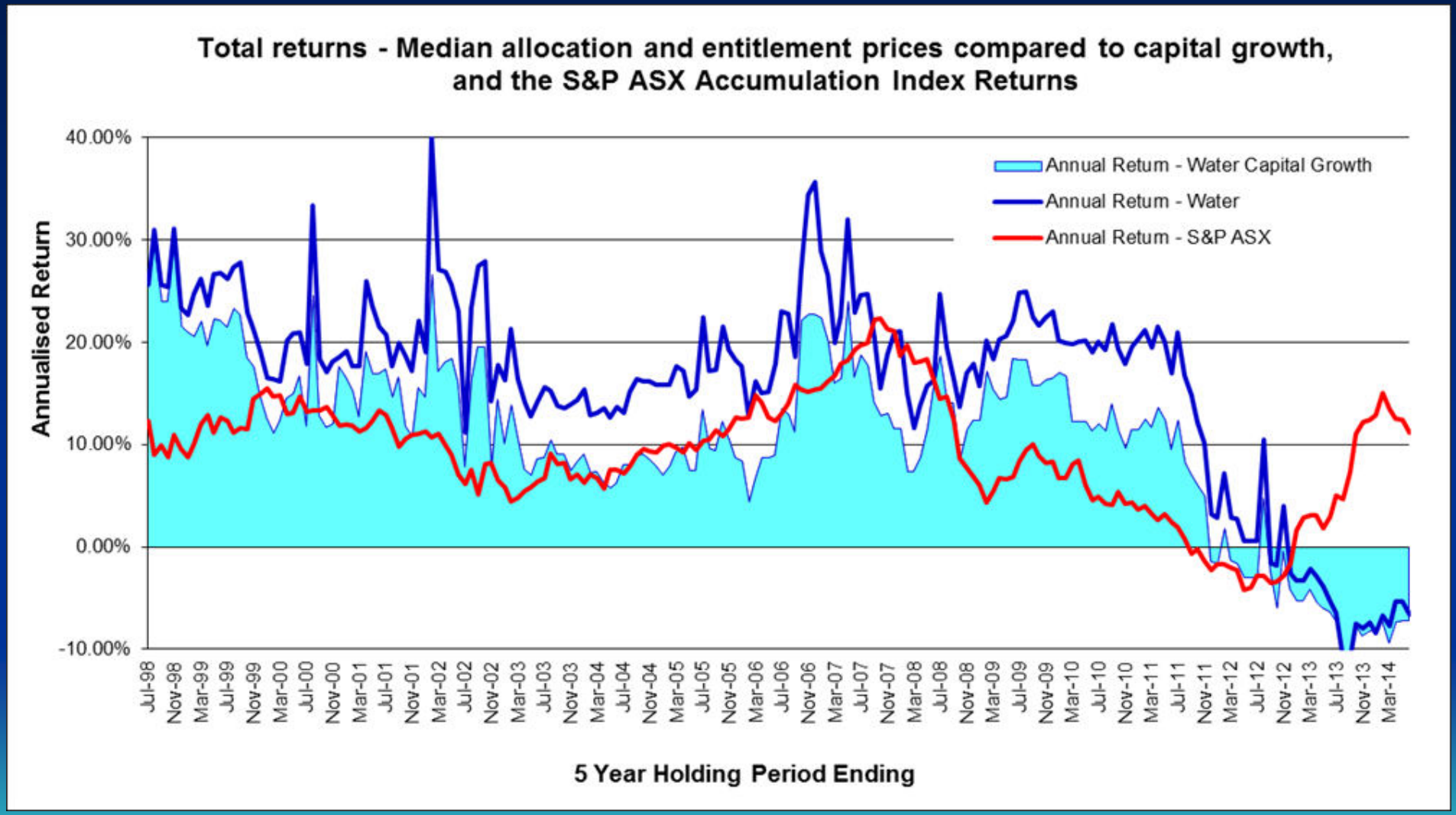
Jan-11
Jul-11
Jan-12
Jul-12
Jan-13
Jul-13
Jan-14
5 Year Holding Period Ending


Total returns - Median allocation and entitlement prices compared to capital growth, and the S&P ASX Accumulation Index Returns
Annualised Return
40.00%
30.00%
20.00%
10.00%
0.00%
-10.00%
Annual Return - Water Capital Growth
Annual Return - Water
Annual Return - S&P ASX
Jul-98
Nov-98
Mar-99
Jul-99
Nov-99
Mar-00
Jul-00
Nov-00
Mar-01
Jul-01
Nov-01
Mar-02
Jul-02
Nov-02
Mar-03
Jul-03
Nov-03
Mar-04
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Jul-11
Nov-11
Mar-12
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Nov-13
Mar-14
5 Year Holding Period Ending

**Return from Water and S&P ASX 200**

| | Entire Series | | |
|---|---|---|---|
| | Mean | St Dev | Correlation |
| Water | 16.28% | 9.79% | 0.3889 |
| S&P ASX | 9.19% | 5.59% | |

**Return form Water and S&P ASX 200 Accumulation Index**
**Comparison of four quarters of series**

| | First Quarter of Series | | | Second Quarter of Series | | | Third Quarter of Series | | | Fourth Quarter of Series | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | St Dev | Correlation | Mean | St Dev | Correlation | Mean | St Dev | Correlation | Mean | St Dev | Correlation |
| Water | 22.81% | 4.98% | -0.3917 | 16.34% | 3.51% | 0.0651 | 21.19% | 4.95% | 0.0930 | 4.78% | 11.15% | -0.3138 |
| S&P ASX | 11.80% | 1.84% | | 8.70% | 2.55% | | 12.96% | 5.54% | | 3.28% | 5.38% | |

# Conclusions

- Water markets have been widely adopted in Australia
- Prices have increased significantly in response to increasing scarcity
- Fundamentals for an efficient market are emerging
- Treating water as another asset class?
- Potential for diversification as part of an investment portfolio.
- Might be an opportunity to move water to most beneficial use each season
- Environmental water holders
- But the institutions must be in place to protect wider societal interests