

# FACT SHEET

## SFE State Water Murray Index

The SFE State Water Murray Index includes five State Water storages, in three valleys. The following table sets out the capacities of these storages.

Storage	Valley	Capacity (ML)	Active Capacity (ML)	Inactive Capacity (ML)	Percentage of Total Index
Burrinjuck	Murrumbidgee	1,026,000	1,022,750	3,250	9%
Blowering		1,630,945	1,606,955	23,990	14%
Dartmouth	Murray	3,907,950	3,816,760	91,190	35%
Hume		3,038,000	3,036,210	1,790	28%
Menindee	Darling	1,730,886	1,515,195	215,691	14%
<b>Total</b>		<b>11,333,781</b>	<b>10,997,870</b>	<b>335,911</b>	<b>100%</b>

The 'Capacity' is the volume of the storage at full supply level. The 'Active Capacity' is the volume of storage between the full supply level and the lowest outlet works. The 'Inactive Capacity' is the volume of storage below the lowest outlet works that is normally not available.

### The Methodology to Calculate the SFE State Water Murray Index

The SFE State Water Murray Index is calculated each day as the sum of the active storage, in each storage, divided by the total active capacity.

$$\text{SFE State Water Murray Index} = \frac{\text{Sum of the active storage volumes} \times 100\%}{10,997,870\text{ML}}$$

The 'active storage volume' is the volume on the day less the inactive capacity. When any storage drops below the inactive capacity, that active storage is said to be zero. This may occur in droughts when the active storage is emptied and the remaining inactive storage continues to evaporate. When any storage exceeds the full supply level, the active storage is set to 100%. This occurs during floods when the storage 'surcharges' and flows begin over the spillway.

The Index does not have a direct correlation with the amount of water made available to irrigators. However, allocations are likely to be high when the Index is high and low when the Index is low.

The Index and any possible futures contracts do not represent the physical delivery of water or the use of water.

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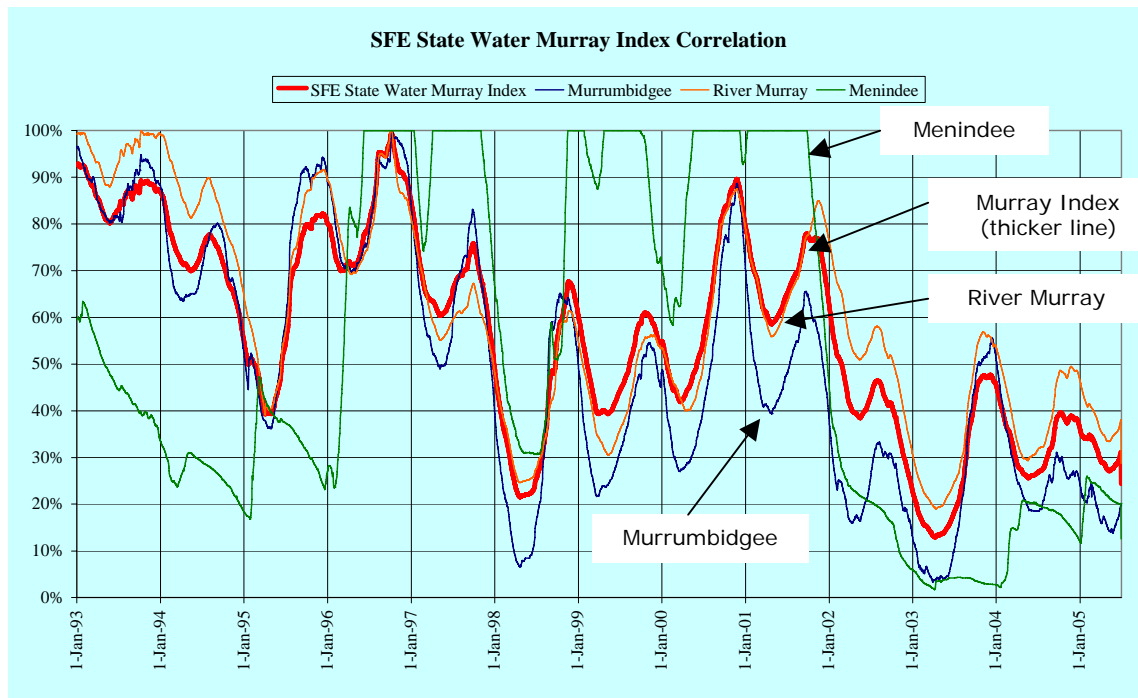
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## SFE State Water Murray Index Correlation

The following chart shows the historic behaviour of the SFE State Water Murray Index with indexes for each of the valleys over the period 1 January 1993 to 30 June 2005.

**Note: charts are best viewed in colour**



The chart shows:

- There is a high degree of correlation between the valleys and the SFE State Water Murray Index.
- The Index is quite seasonal with lows in about May and highs in about October each year.
- There have been very poor seasonal conditions since 2002 as reflected in the low Index values.
- There were good climatic seasons from 1993/94 with a peak in 1996.
- There were poor climatic seasons in 1998-2000.
- The storages in the Murray Valley (Dartmouth and Hume) make up about 63% of the SFE State Water Murray Index. Therefore, the Index and the Murray storage figures track closely together with Hume and Dartmouth.
- The Darling (Menindee) only accounts for about 14% of the Index so does not have as large an influence on the Index. However, Menindee contributes to water availability in the Murray and is therefore included in the Index. Menindee also has a large catchment so its volume reflects seasonal conditions in a large part of the Murray-Darling Basin

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September 2005

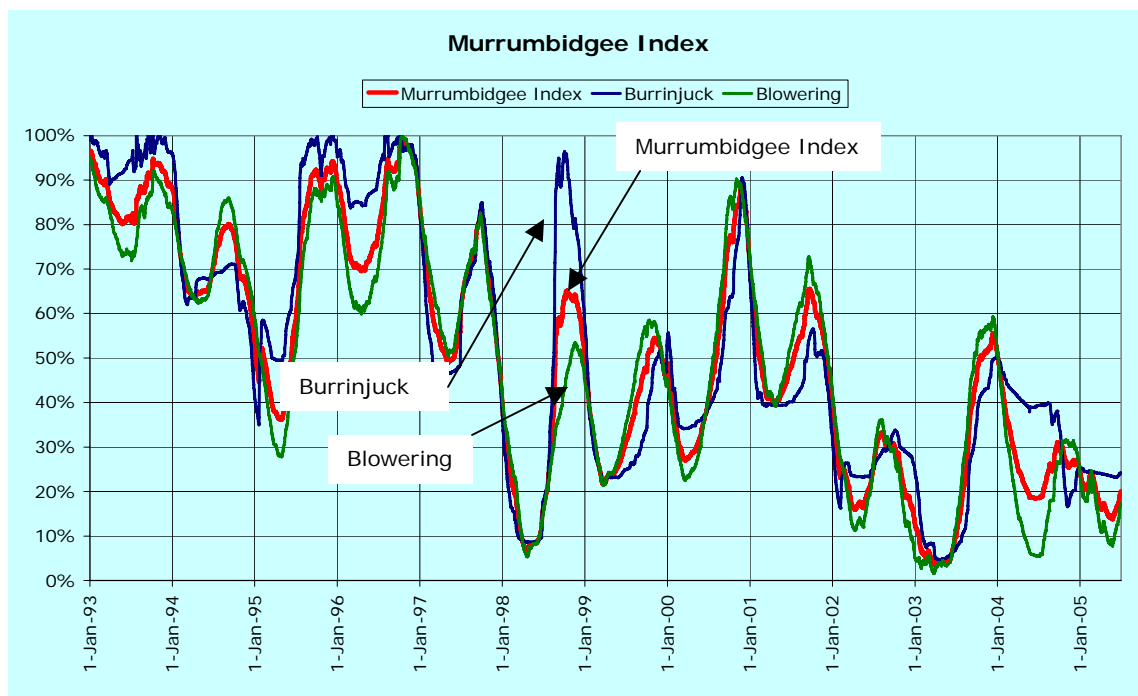
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## Individual Valley Indexes

State Water is not proposing to publish separate storage indexes for each valley. The high degree of correlation between the indexes means that it may not be warranted to publish these indexes separately.

## Murrumbidgee Index

The following chart shows the historic behaviour of a Murrumbidgee Index against Burrinjuck and Blowering Storages (storage indexes) over the period 1 January 1993 to 30 June 2005.



The chart shows:

- Burrinjuck and Blowering operate in parallel to supply the Murrumbidgee River. Releases from each storage are managed to maintain a balance between Burrinjuck and Blowering, however inflows to each can vary from their catchments and Blowering's inflows are predominantly from Snowy Hydro.
- The Murrumbidgee is quite seasonal with lows in about May and highs in about October each year.
- There is good correlation between the behaviour of the storages. Both storages generally rise and fall at the same time due to wet and dry seasonal conditions.
- In periods where the storages are at different levels such as June 2004, the Index gives a better indication of overall conditions in the valley than does either storage.

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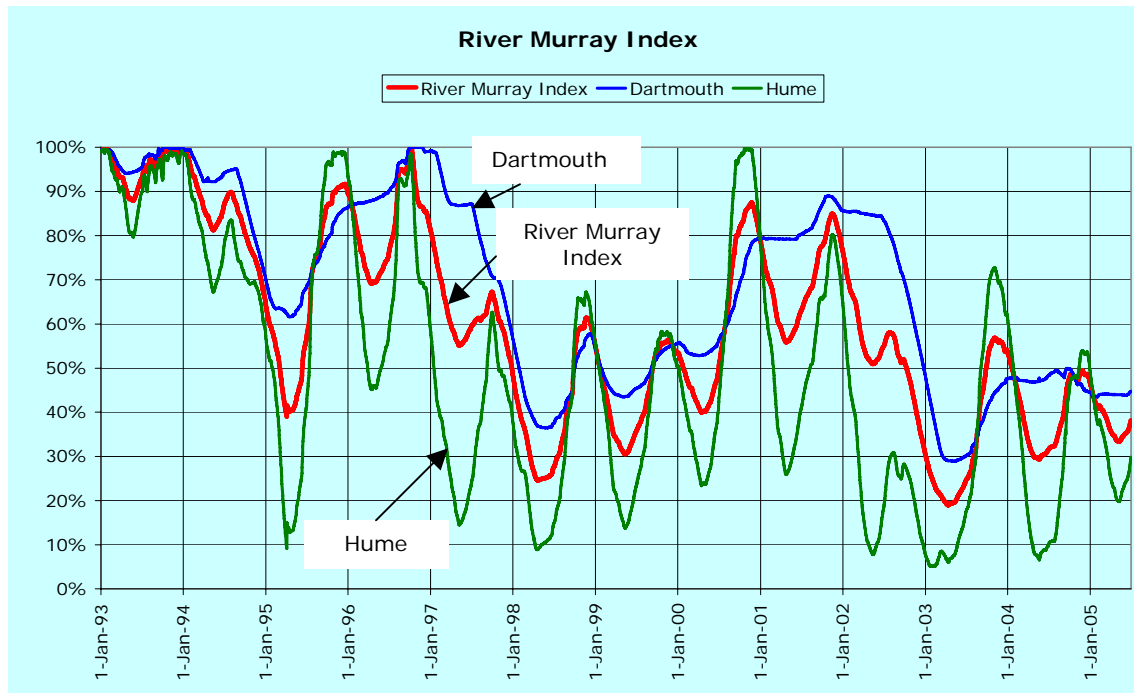
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In this case, conditions in the valley were poor, but were variable, depending on where drought-breaking rains occurred.

## River Murray Index

The following chart shows the historic behaviour of a River Murray Index against Dartmouth and Hume Storages (storage indexes) over the period 1 January 1993 to 30 June 2005.



The chart shows:

- There were poor climatic seasons in 1998-1999 and 2002-2004.
- There were good climatic seasons in 1993-1997.
- Dartmouth and Hume are operated together for the whole Murray Valley.
- Water is only released from Dartmouth to Hume in extended dry periods such as 1997/98 and 2002/03. These periods correspond with lower index values, as both storages are emptying.
- The Index provides a better description of the overall seasonal conditions and water availability than the active storage capacity of either the Dartmouth or Hume storages by themselves.
- The Index only rises to very high levels, and falls to low levels, when both Dartmouth and Hume are full, or low.

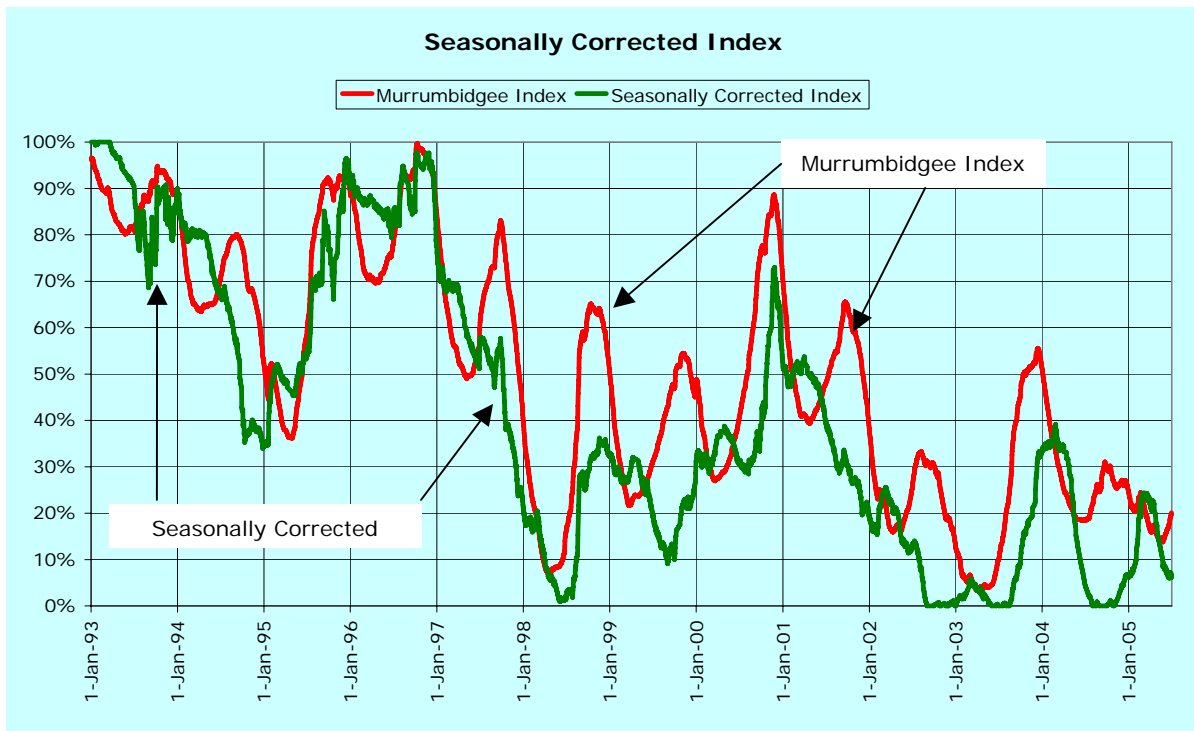
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## An Example of Seasonal Correction

The following chart shows the Murrumbidgee Index and the Seasonally Corrected Index for the period 1 January 1993 to 30 June 2005.



- The red “Murrumbidgee Index” plots the combined storage of Burrinjuck and Blowering Storages, expressed as a percentage of the combined storage capacity.
- The green “Seasonally Corrected Index” ranks the storage index as a percentile exceedance for each day. The Seasonally Corrected Index tells whether the storage index is higher than normal (corrected indexes of above 50%) or lower than normal (corrected indexes of less than 50%).
- For example in late 1998 the storage index peaked at around 65%, while the Seasonally Corrected Index was about 35%. That is, in the latter months of the year a storage index of 65% is less than normal and quite low. This storage index ranks with only 35% of years expected to be lower than this.
- As a general rule when the storage index is high the seasonally corrected figures will also be high and when the Index is low so are the seasonally corrected figures.
- The figures for 1993 and 1996 are amongst the highest expected, with Seasonally Corrected Indexes of more than 90%. While 1998 and 2002 to 2004 have had periods as low as will ever be expected to be experienced, with Seasonally Corrected Indexes of zero%.

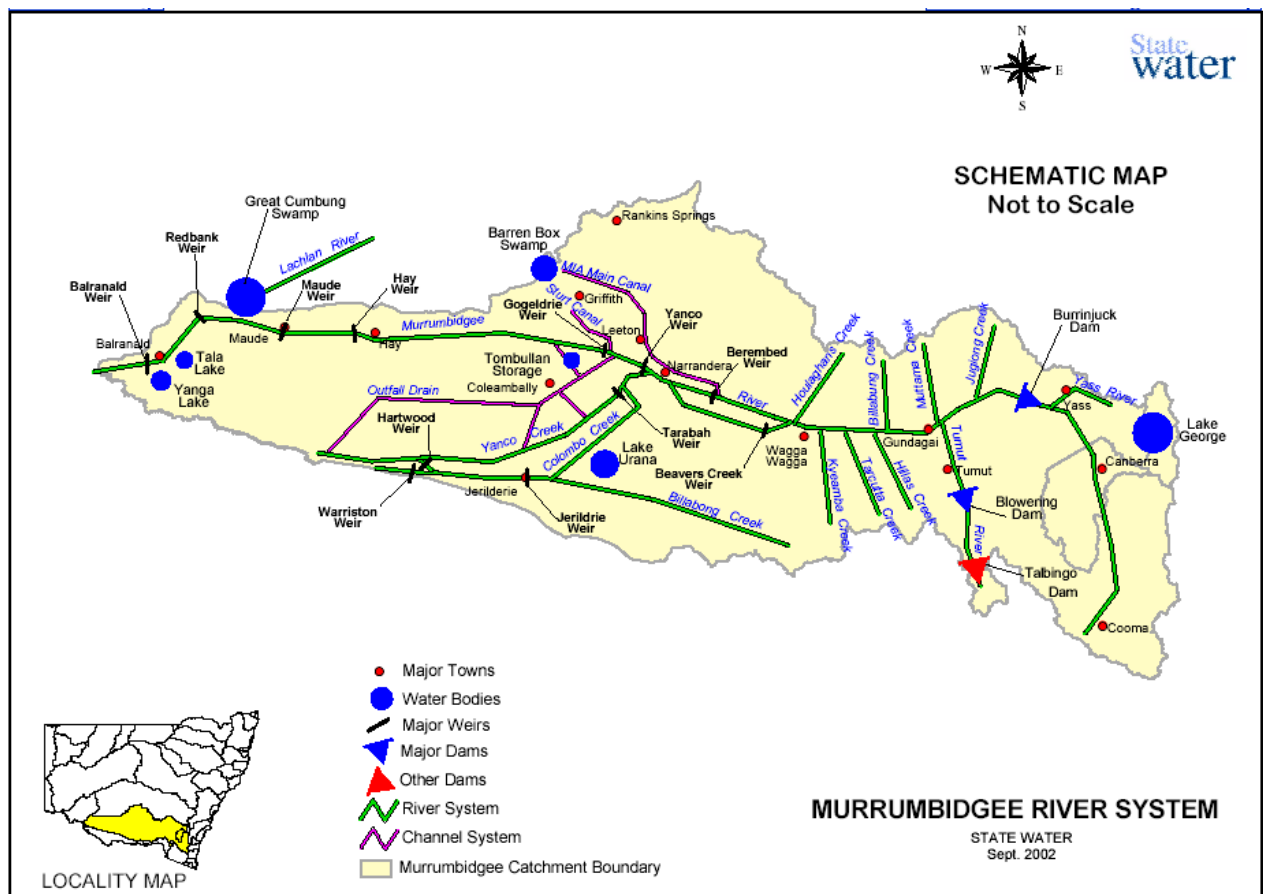
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- There are some significant differences between the two indexes. There are some periods where the storage index rises and the seasonally corrected figures fall, and visa versa.
- In the period plotted above the storage index rises to some extent each winter, however the Seasonally Corrected Index falls in some winters. This occurs in 1994, 1999, 2001 and 2002. Although the storages were rising in these winters they were rising much less than average, primarily because these were drier winters. Therefore the Seasonally Corrected Index falls, showing that there were declining conditions in those winters.
- The Seasonally Corrected Index has the potential to communicate more information about the state of the regions seasonal conditions, that is whether it is much wetter or drier than average.

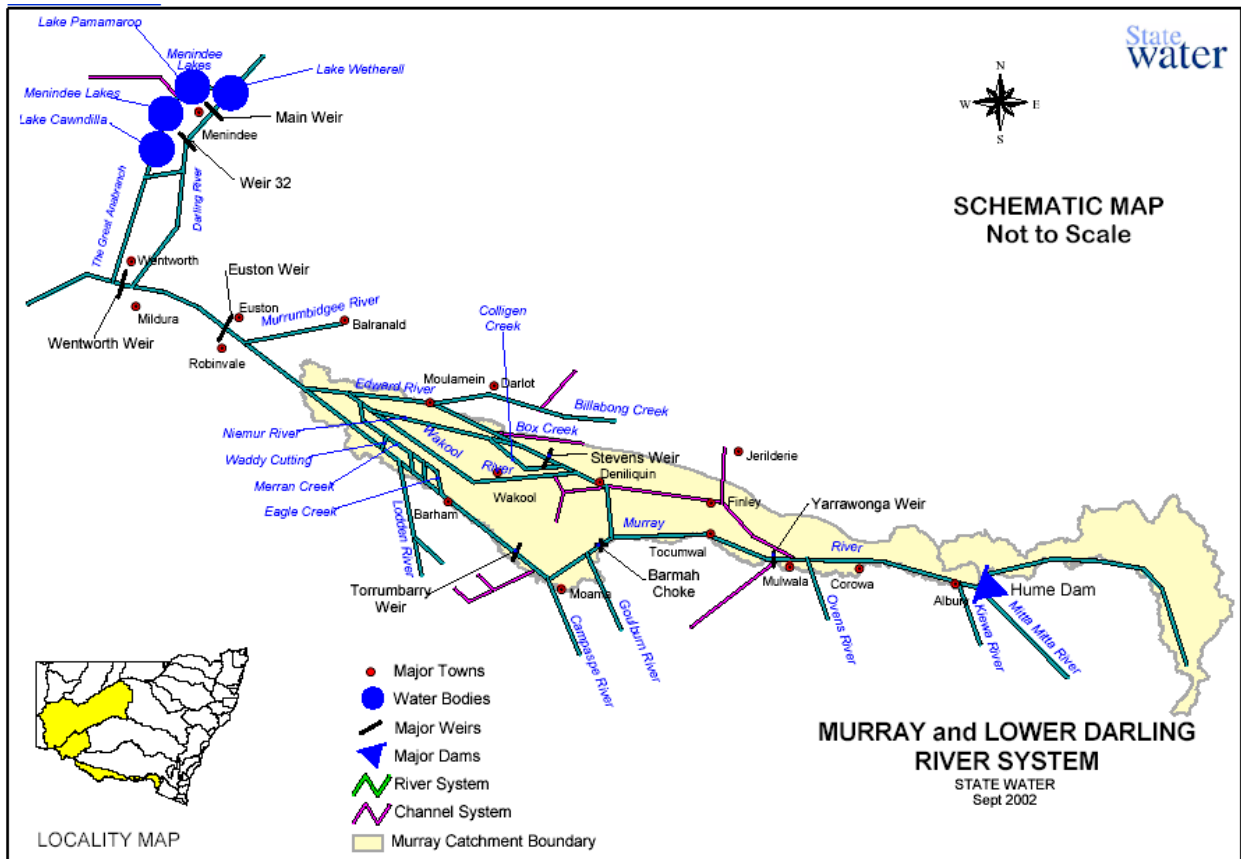
**Schematic maps relating to the Murray Index**



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