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**The Future of the Snowy River**

by

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## **EXECUTIVE SUMMARY**

The Snowy River has its headwaters in the montane areas of the Snowy Mountains, and flows 380 km to the sea by the Victorian town of Marlo. The River is largely dependent for flow on the catchment above Jindabyne due to a rain shadow effect on the tablelands. For instance, mean annual rainfall varies with up to 2000 mm in the Snowy Mountains and less than 500mm in the rain shadow affected areas around Dalgety.

The Snowy Mountains Scheme captures and diverts the waters of 12 rivers and 71 creeks. It includes 16 dams, 18 aqueducts, 19 trans-mountain tunnels, 7 power stations and 2 pumping stations. The Scheme has diverted approximately 99% of the Snowy River's natural flow below Jindabyne Dam.

Under current water release arrangements, the Scheme is required to provide a minimum of 2,088 GL of regulated water to the Murray and Murrumbidgee systems each year. However, on average, it actually provides long term releases of 2,410 GL. The average annual release into the Murray is 1,200 GL and 1,210 GL into the Murrumbidgee. Approximately half of this water is from the Snowy River catchment (long term average flow is approximately 1,150 GL) and half is water which would flow into these systems naturally but has been regulated by the Scheme.

The annual diversion and storage of water from the Snowy River increases the availability of water in the western rivers and provides drought insurance to irrigation schemes located in the Murray and Murrumbidgee valleys.

The Snowy-Murrumbidgee portion of the Scheme provides on average 25% of the flow in the Murrumbidgee River, which increases to around 60% during drought periods. The reliability of the Scheme has underpinned primary production. The Snowy-Murray portion of the Scheme provides an average of about 10% of the flows to the Murray system but during periods of drought its contribution can rise to about 33%.

The Snowy Mountains Hydro-Electric Authority is in the process of being corporatised. As part of this process, the NSW and Victorian governments sponsored the 'Snowy Water Inquiry' to examine and report on environmental issues from the current pattern of water flows in the Snowy Mountains region, including environmental flows. The Inquiry recommended that 15% of the original flow of the Snowy River be restored immediately below Jindabyne Dam.

Since the release of the Snowy Water Inquiry's Final Report, there has been constant debate in the community and media on the appropriateness of restoring environmental flows to the Snowy. The issue is complicated by the fact that there are three governments who must agree on the final decision – the Victorian, NSW and Commonwealth, and any decision may impact on the drinking water of South Australia, so the South Australian Government has also been active in the debate.

## 1 INTRODUCTION

The Snowy River is one of the most celebrated rivers in Australia, featuring in both Australian literature and film. The river has been immortalised by the poem ‘The Man from Snowy River’ by Banjo Paterson. However, whilst the topography of the region is as rugged as featured in the poem by Banjo Paterson, the Snowy River is now merely a trickle of its former self.

The Snowy Mountains Hydro-Electric Scheme (the Scheme) is also an icon in Australian history, and is the most complex, multi-purpose, multi-reservoir hydro scheme in the world. \$820 million (in 1950 dollars) was invested in the Scheme.<sup>1</sup> Water from the Snowy and other rivers is diverted westward, used for the production of hydro-electricity, and then released into the Murrumbidgee and Murray Rivers for irrigation purposes. The Snowy River is presently flowing at 1% of the original flow immediately below Jindabyne Dam.

The irrigated lands of the Murrumbidgee and Murray Rivers, with water supplied by the Scheme, support agricultural production worth over \$750 million per year, including virtually all of Australia’s rice production.

With the development of the national electricity market, and the resultant public policy decision to corporatise the Snowy Mountains HydroElectric Authority, interest in the ‘fate’ of the Snowy began to rise. This culminated in legislation, the *Snowy Hydro Corporatisation Act 1997*, that provided for a Snowy Water Inquiry, to provide the NSW and Victorian governments with options to restore the environment of the Snowy and its associated rivers.

However, it is also important to note that the Snowy Water Inquiry was not the first study of the Snowy River with a view to providing environmental flows. For instance, the Snowy River Environmental Flow Scoping Study 1994 was prepared by the NSW Department of Land and Water Conservation, the Victorian Department of Conservation and Natural Resources, and the Snowy Mountains Hydro-electric Authority. The study modelled a series of different flow regimes to assess the likely outcomes. The study concluded that improvements in the river only started to have an impact at 12.5% of the original flow but at this level fell short of any meaningful outcome. The Snowy River Alliance concluded from the study that 25% of the original flow, seasonally adjusted, is required to significantly improve the state of the River.<sup>2</sup>

In 1996 the Snowy Genoa Catchment Management Committee convened an expert panel to determine an appropriate environmental flow regime. The Panel recommended that 28% of the Snowy’s original flow was required to improve the morphology and habitat of the River, and that a flood pulse once or twice a year was necessary for geomorphic reasons.

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<sup>1</sup> Snowy Mountains Hydro-Electric Authority, *The Power of Water. The Story of the Snowy Scheme*. No Date, at 9.

<sup>2</sup> Snowy River Alliance, *Submission to the Snowy Water Inquiry*, 21.5.98, at section 4.2.

Since the release of the Catchment Management Committee's report, conservation groups have 'latched' on to the figure of returning 28% of the Snowy's original flow back to the River.

## **2 HOW THE SNOWY RIVER HYDRO-ELECTRIC SCHEME OPERATES**

The Snowy River has its headwaters in the montane areas of the Snowy Mountains, and flows 380 km to the sea by the Victorian town of Marlo. The River is largely dependent for flow on the catchment above Jindabyne due to a rain shadow effect on the tablelands. For instance, mean annual rainfall varies with up to 2000 mm in the Snowy Mountains and less than 500mm in the rain shadow affected areas around Dalgety.

The Snowy Mountains Scheme captures and diverts the waters of 12 rivers and 71 creeks. It includes 16 dams, 18 aqueducts, 19 trans-mountain tunnels, 7 power stations and 2 pumping stations. The Scheme can be divided into two sections:<sup>3</sup>

- The Snowy-Tumut development diverts waters from the upper Murrumbidgee, Goodradigbee, Eucumbene and Tooma Rivers to the Murrumbidgee River via the Tumut River. The waters are diverted westward from Lake Eucumbene through a transmountain tunnel to Tumut Pond reservoir. From there they join the waters of the Tooma and Tumut Rivers, which rise on the west of the range, and are passed through a series of power stations located in the Tumut Gorge. Once the waters have passed through the power stations they are released, via Blowering Dam in the Tumut River and on to join the Murrumbidgee west of Yass.
- The Snowy-Murray development diverts waters from the Snowy and Geehi Rivers to the Murray River via the Swampy Plains River. The waters of the Snowy River are diverted westward from Island Bend reservoir through a transmountain tunnel to Geehi reservoir. There with water from the Geehi River it makes its way through two power stations before being released in the headwaters of the Murray River. Provision is also made for the storage of water from Island Bend into Lake Eucumbene for future use. Additional supplies of water for the Murray development are obtained directly from Lake Jindabyne where a pumping station lifts water into the main east-west diversion tunnel using low cost off peak thermal power.

Major regulating structures associated with the Scheme on the Snowy River include:

- Guthega dam (capacity 1,800 ML);
- Island Bend dam (capacity 3,100 ML);
- Jindabyne Dam (668,000 ML).

Structures associated with the Scheme on the Eucumbene River include:

- Eucumbene Dam (capacity 4,800,000 ML).

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<sup>3</sup> Snowy Mountains Hydro-Electric Authority, *The Power of Water. The Story of the Snowy Scheme*. No Date, at 14.

Lake Eucumbene is the main storage in the Scheme. In addition to generating electricity, the Scheme is used to regulate the supply of water for irrigation in the Murrumbidgee and Murray valleys in conjunction with downstream irrigation dams.

The operation of each of these dams and associated aqueducts significantly affects the river immediately downstream, often leaving little or no flow in the channel.

The Scheme has diverted approximately 99% of the Snowy River's natural flow below Jindabyne Dam. In addition, the Mowamba River, a tributary which joins the Snowy River about 2 km downstream of Jindabyne Dam, has been substantially diverted by an aqueduct to flow into Lake Jindabyne. Water has spilled over the Jindabyne Dam wall twice since 1968.<sup>4</sup>

## 2.1 Snowy Mountain Scheme Water Releases

Under current water release arrangements, the Scheme is required to provide a minimum of 2,088 GL of regulated water to the Murray and Murrumbidgee systems each year. However, on average, it actually provides long term releases of 2,410 GL. The average annual release into the Murray is 1,200 GL, and 1,210 GL into the Murrumbidgee. Approximately half of this water is from the Snowy River catchment (long term average flow is approximately 1,150 GL) and half is water which would flow into these systems naturally but has been regulated by the Scheme.<sup>5</sup>

The annual diversion and storage of water from the Snowy River increases the availability of water in the western rivers and provides drought insurance to irrigation schemes located in the Murray and Murrumbidgee valleys.

The Snowy-Murrumbidgee portion of the Scheme provides on average 25% of the flow in the Murrumbidgee River, which increases to around 60% during drought periods. The reliability of the Scheme has underpinned primary production. For example, the Coleambally irrigation area in NSW with 500 GL of entitlements was developed on the basis of the additional supply from the Scheme. The Snowy-Murray portion of the Scheme provides an average of about 10% of the flows to the Murray system but during periods of drought its contribution can rise to about 33%.<sup>6</sup>

## 2.2 Electricity Production of the Snowy Mountains Scheme

The Scheme has a generation capacity of 3756 megawatts which is approximately 17% of the capacity of south-eastern Australia. In peak periods, the Scheme provides an average of 10% of total energy requirements. The Scheme provides 82.5% of the hydro-electricity

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<sup>4</sup> Environment Protection Authority, *Proposed Interim Environmental Objectives for NSW Waters: Interstate Catchments Snowy and Genoa*, November 1997 at 24.

<sup>5</sup> Snowy Water Inquiry, *Draft Options for Discussion*, 1998, at 11.

<sup>6</sup> Snowy Water Inquiry, *Draft Options for Discussion*, 1998, at 13.



in mainland Australia, and is estimated to displace 5 million tonnes of carbon dioxide emissions every year which would be produced if the same quantity of electricity had been produced by thermal power stations.

Hydro-electricity is one of the most flexible forms of electricity generation, which means that it can respond quickly when required to an unexpected increase in generation needs, or for supplying peak hour energy requirements.

### **3 THE CORPORATISATION OF THE SNOWY MOUNTAINS HYDRO-ELECTRIC AUTHORITY**

In 1949 the Commonwealth passed legislation establishing the Snowy Mountains Hydro-Electric Authority as a Commonwealth statutory authority to manage the construction and operation of the Scheme. Complementary legislation was passed in NSW and Victoria in 1958 to ratify agreements between the three governments about the operation of the Scheme.

Presently, the three governments are in the process of corporatising the Authority. Legislation to corporatise the Authority has passed through the Commonwealth, Victorian and NSW Parliaments, which will enable the establishment of the company Snowy Hydro Limited to manage the Scheme as a commercial operation and participate in the national electricity market. As part of the corporatisation process, the NSW and Victorian governments sponsored the 'Snowy Water Inquiry' to examine and report on environmental issues from the current pattern of water flows in the Snowy Mountains region, including environmental flows. Proclamation of the legislation is dependent upon the negotiation of the outcomes of the Snowy Water Inquiry and the provision of environmental flows for the Snowy region rivers.

Section 21 of the *Snowy Hydro Corporatisation Act 1997* relates to the Water Inquiry and states:

- (3) It is the duty of the Minister to use his or her best endeavours to determine the response of the State of New South Wales to that final report, and to reach an agreement with the State of Victoria on the outcomes of the inquiry, within 2 months after that final report is made or within such other period as is agreed between the Minister and a Minister of the State of Victoria.
- (4) The agreement is to provide for:
  - (a) the initial release of water to the Snowy River for environmental reasons on the issue of the Snowy water licence, and
  - (b) the increased amount of such releases of water following the first review of the Snowy water licence under this Act that will not give the Company an entitlement to compensation under section 30.

The Hon Robert Webster was appointed Commissioner to head the Snowy Water Inquiry, which delivered its final report on 28 October 1998. Clearly, the respective State Governments have taken longer than two months, as indicated in the legislation above, to reach an agreement on the outcomes of the Inquiry.

The Act provides for possible compensation payments to Snowy Hydro for any action taken that has an adverse financial impact on the company. Section 30 of the Act states:

(1) The State of New South Wales may enter into an agreement to compensate the Snowy Hydro Company for any action taken by the Water Administration Ministerial Corporation or the State in relation to the Snowy water licence that has an adverse financial impact on the Company.

(2) In subsection (1), action includes varying or terminating the licence, but does not include:

(a) any action that is agreed between the States of New South Wales and Victoria and identified in the agreement as an agreed outcome of the water inquiry under Part 4, or

(b) any variation of the licence following the first review of the obligations under the licence to release water to the Snowy River for environmental reasons (to the extent of any increase in the water so released that does not exceed the increased amount referred to in section 21 (4) (b)), or

(c) revoking the licence in accordance with section 28.

The corporatisation of the Authority will provide for the Water Administration Ministerial Corporation (ie, Minister for Land and Water Conservation) to grant a water licence to Snowy Hydro Ltd to provide Snowy Hydro the rights to collect, divert and store water from the rivers and streams within the relevant area and vary the timing of its releases. The initial term of the licence will be 75 years.

Included in the licence will be two schedules. One schedule will set out Snowy Hydro's environmental flow obligations which will be reviewed after five years and every ten years thereafter. This schedule will be prepared after the Governments have agreed on the implementation of the outcomes of the Snowy River Inquiry. The other schedule will set out Snowy Hydro's operational guidelines and requirements.

The practical ability of governments to adjust environmental flows after the initial licence is issued may be limited. Changes which have an adverse impact on Snowy Hydro's financial position may trigger a requirement that the NSW Government provide compensation to the Company. The single exception is the variation of Snowy River release rules following the first five year review, which will be limited to the quantity provided for under section 21(4)(b) of the Act, as stated above.<sup>7</sup>

<sup>7</sup> NSW Agriculture, *Initial Submission to the Snowy Water Inquiry*, May 1998, at 4.

Under the provisions of the Act, the Government: cannot reduce releases to the Snowy River below the initial release level before or after the first five year review; can increase releases up to a level agreed as an outcome of the first review without compensating Snowy Hydro – any increases beyond that level may have to be compensated; and after the first review if any increase in water releases are made, then releases are prohibited from falling below the revised level.

#### **4 THE PRESENT CONDITION OF THE SNOWY SCHEME RIVERS<sup>8</sup>**

In 1947 the Commonwealth and State Snowy River Committee was appointed to investigate proposals to utilise the waters of the Snowy River. It is worth reproducing their comments on the likely effect of the Scheme on the Snowy River. The Committee concluded the following:

At the present time, little use is being made of the Snowy River...it rises in NSW...until it flows to waste in the sea. For most of its length it is through rugged, undeveloped country with no close settlement near it, but for the last 20 miles before reaching its mouth at Marlo...

No use is made of its waters for power production and practically none for irrigation...

Although no appreciable irrigation of the rich river flats near Orbost is carried out from the Snowy River, the view was expressed by residents that a considerable reduction in the river flow might cause the following results:

- (a) lowering of the water table under the Flats with consequent loss of fertility in the summer;
- (b) deposition of silt in the bed of the river through the Flats;
- (c) the extension further upstream of salt water from the sea, affecting the watering of stock, and the use of wells for water supply; and
- (d) the closing of the mouth of the river by a sand-bar at times of low flow, resulting in flooding of low areas before the bar can be broken down by the increased head or by freshets.

After inspection of the area and consideration of the problems, it was decided that there was little justification for the fears mentioned, and moreover, that if any deleterious effects appeared they could be overcome by the construction of relatively minor works, such as for instance, the provision of a comparatively small storage on one of the Snowy tributaries below Jindabyne for boosting the flow of the river should it decrease at time to dangerous limits.

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<sup>8</sup> This section is taken from: Snowy Water Inquiry, *Snowy Water Inquiry Final Report. Submitted to the Governments of New South Wales and Victoria*, Robert Webster, Commissioner, 23 October 1998, at 41.

As any such minor work would be wholly in the State of Victoria, ...it was decided that Victoria should accept full responsibility for dealing with any deleterious effects on the lower reaches of the river caused by the diversion to the Murray and Tumut of the Upper Snowy waters.<sup>9</sup>

It is evident from the above comments by the Committee that the attitude in the late 1940s and early 1950s was one of dismissal of the problems of the Snowy River. History has shown that rather than there being 'little justification for the fears mentioned', reduction in river flow has instead grown into a significant environmental and social problem, causing communities and governments considerable distress.

Whilst most of the current day public concern has focussed on environmental flows for the Snowy River, in particular that part below Jindabyne Dam, in fact, the operation of the Scheme has modified the environments of the upper Snowy, upper Murrumbidgee, Tooma, Geehi, Swampy Plain, Murray, Tumut and Eucumbene Rivers, together with other streams controlled by weirs and aqueducts.

Immediately below each diversion point of the Scheme virtually all natural flows have stopped, except for Jindabyne and Tantangara Dams which release small quantities of water for stock and domestic uses. Other dams such as Guthega and Island Bend have spill releases but these do not mimic the natural variability of flows. The modified rivers have responded in different ways to the changed flow conditions, depending on local climate and geography, and the physical conditions of river reaches.

The upper Snowy River (above Jindabyne) has been considerably modified in the three river reaches below Guthega Dam. The reach between Guthega Dam and Guthega Power Station retains 10% of flow occurring as spills because the Dam and associated aqueducts intercept almost all flows. These flows are returned to the Snowy River downstream of Guthega Power Station.

The reach between Guthega Power Station and Island Bend Dam has the same annual flows as under natural conditions but the pattern of flow is highly modified. There is a marked diurnal pattern of flow, because the power station releases water to match periods of high energy demand which usually occurs in the morning. The flow in the reach between Island Bend Dam and Lake Jindabyne has been reduced by 97% because of the diversion of flow by the Snowy-Geehi tunnel.

Whilst the actual channel structure of the upper Snowy has not changed that much, the range of plant and animal life has changed. This is due to the water being generally shallower or slower flowing, warmer in summer, and more isolated from the shade, shelter, habitat and food resources normally supplied by stream-side vegetation.

Downstream of Jindabyne the flow and size of the Snowy gradually recovers due to tributary inflows. However, the flows are still of reduced size and changed pattern

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<sup>9</sup> Commonwealth of Australia, *Diversion and Utilisation of the Waters of the Snowy River. Final Report of Commonwealth and States Snowy River Committee, May 1950*, at 35.

compared to pre-Scheme. This pattern is also evident in the other major rivers of the Scheme.

In adapting to these changes, the physical structure of each river and ecology have also changed. These long term impacts are also sometimes compounded by other catchment changes such as agricultural development and the intrusion of weeds such as willow and blackberry.

The reduced flow in the Snowy and other rivers has allowed weeds to establish and spread within the river corridor. Weeds displace the native vegetation, can change habitat conditions for native fauna and can change the physical conditions such as the bed structure. The impact of willows is particularly evident in reaches of the Snowy, Eucumbene and Tumut Rivers.

The population of insects and other water macro-invertebrates has changed in the waters downstream of Jindabyne Dam and other waters below dams. Whilst the pool fauna has been found to be diverse, as riffle areas have contracted the total number of macro-invertebrates in the 'fast water' areas has been reduced.

Dams and weirs also interrupt natural processes such as fish migration and the distribution of animals and plants. About 35 species of freshwater fish and over 60 species of estuarine fish are found within the rivers associated with the Scheme. Of the freshwater fish, 27 are native species of which 11 are listed as either threatened or rare. Most of the native fish species are present in low numbers, but some may be locally abundant. Introduced fish are common and often abundant.

Further downstream of the Snowy River, a range of factors has changed the character of the lower reaches, including increased sediment deposition associated with erosion in the catchment and the reduced flow regime.

Although the average annual flow in the Snowy River below Jindabyne is about 1% of the natural flow before dam construction, tributary inflows downstream mean that long term average flows in the lower Snowy River are about 53% what they were before the Scheme development. The main changes to the lower Snowy River includes the loss of high spring flows associated with snow melt in the mountains, and therefore the increased occurrence and duration of low flow periods.

Salt water from the estuary at the Victorian coast of Marlo is now found seven to ten kilometres further upstream than pre-Scheme. This increased salinity has reduced the health of riverside and estuarine vegetation and has exposed river banks to erosion.

**Table 1: Key Statistics for the three main Snowy River Scheme Rivers<sup>10</sup>**

River	Length of river (km)	Average flows below storages (GL)		Average flows at sea/end of river (GL)		Households living along rivers
		Natural	Current	Natural	Current	
Snowy	380	1,150	9	2,150	1,190	25,300
Murray	2,530	4,180	4,630	13,600	5,230	205,300
Murrumbidgee	1,690	2,500	3,000	3,550	1,550	57,400

## 5 IRRIGATED AGRICULTURE IN THE MURRUMBIDGEE AND MURRAY RIVERS OF NSW<sup>11</sup>

### 5.1 The Murrumbidgee River

The Murrumbidgee River, located in central southern NSW, stretches 1,600 km from its source in the Snowy Mountains to the junction with the Murray River downstream from Balranald. The Murrumbidgee is a major tributary of the Murray – Darling river system.

After flowing north towards Canberra, the Murrumbidgee River then extends west through the main centres of Gundagai, Wagga Wagga, Narrandera, Darlington Point, Hay and Balranald, after which it joins the Murray River. The major irrigation areas and districts which the Murrumbidgee River supplies include the Murrumbidgee Irrigation Area, centred on the towns of Leeton and Griffith, and the Benerembah, Tabbita and Wah Wah Irrigation Districts. The Coleambally Irrigation Area is located on the southern side of the River and includes the town of Coleambally.

There are approximately 1,940 farms in the Murrumbidgee Valley which are irrigated broadacre and perennial horticulture farms. The major irrigated crops include rice, wheat, oilseeds, citrus, winegrapes, stonefruit, vegetables and annual and perennial pastures supporting livestock enterprises. However, rice is the most common crop grown in the region, and it is estimated that 89 % of the irrigated broadacre producers in the Murrumbidgee River valley grew rice in 1994-95.

<sup>10</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 46.

<sup>11</sup> This section is adapted from: NSW Agriculture, *Initial Submission to the Snowy Water Inquiry*, May 1998.

The ability to grow rice is heavily dependent on annual water allocations which largely determine the profitability of farm enterprises. The value of irrigated agriculture in the Murrumbidgee Valley in 1995-96 was approximately \$422 million.

A survey undertaken in 1996 found that around 52 % of the irrigation water used in the Murrumbidgee Irrigation Area and Districts was used for rice production and a further 31 % was used for cereal and pasture production.

## **5.2 The Murray River**

The Murray River begins near Mt Kosciuszko and flows 2,500km into Lake Alexandria, near Adelaide in South Australia. The river forms part of the border between Victoria and NSW and supplies water for the NSW irrigation areas of Berriquin, Cadel and Denimein, and the Wakool Irrigation District. These schemes lie to the north of the Murray River and are centred on the towns of Deniliquin, Finley and Wakool.

There are approximately 1,800 irrigated farms in the Murray River valley comprising broadacre and dairy farms. The Murray Valley has similar irrigated enterprises to those of the Murrumbidgee Valley with rice being an integral part of farming systems. The main difference between the two valleys is that the Murray has much smaller areas of perennial horticulture and a significant and expanding dairy industry. The value of irrigated agriculture in the Murray Valley of NSW in 1995-96 was approximately \$315 million, representing around 35% of total agricultural production in the region.

The Snowy Mountains Scheme, with its diversions of water to the western rivers, underwrites irrigated agricultural production in southern NSW worth over \$750 million, including virtually all of Australia's rice production. The nature and extent of irrigation development in the Murrumbidgee and Murray valleys has been substantially influenced by the additional supply of water provided by the Scheme.

The Department of Agriculture concludes that reductions in allocations of water to farms for increased allocations to environmental flows within the Snowy River catchment will have significant implications for the profitability of broadacre farms. Changes which substantially reduce the supply of water to western rivers, particularly during drought periods, has the potential to significantly affect irrigated production and the viability of established businesses.

## **6 SOURCES OF WATER FROM THE SNOWY MOUNTAINS SCHEME**

The provision of water for environmental flows to the Snowy River assumes that less water will be available for diversion to the inland river systems. The Scheme network of storages and aqueducts provides a high degree of regulation of inflows to the Scheme and spills from its major storages are relatively rare. Virtually all water from the Scheme is released to the Murray and Murrumbidgee Rivers, either as an assured annual release underpinning the security of irrigation entitlements or as a release specifically for electricity generation or storage purposes. All releases from the Scheme also contribute to the environmental needs on the Murray and Murrumbidgee Rivers.

In this way all the water from the Scheme has been fully committed to the inland river systems for either consumptive or non consumptive use. As a result of this, the sourcing of water to meet environmental flow options, particularly where this results in reduced flows to the inland rivers, is a key issue for governments.

The ‘guaranteed’ annual output from the Scheme (of 2,088 GL) represents approximately 85% of the long-term average releases from Murray 1 and Tumut 1 power stations. The remaining 15%, and any components of the 85% not released during wetter years and carried over within the Scheme, are released at the discretion of Snowy Hydro. Decisions on this discretionary release of water are generally based on obtaining suitable electricity prices or to control storage levels and minimise spills. Under this operation, there is no certainty over the timing of these releases within a year or from one year to the next. The guaranteed annual output from the Scheme is the volume the Scheme would be able to continue to supply every year through a repeat of the worst drought on historic record. Under this drought, which occurred in the 1940s, the Scheme storages would have just emptied with no reserves left.<sup>12</sup>

The Snowy Water Inquiry identified five possible sources of water for environmental flows. These were:<sup>13</sup>

- Releases from Scheme storages which didn’t reduce diversions to the Murray and Murrumbidgee Systems;
- Changes to Scheme management to increase assured annual releases;
- Increasing the regulation of the Murray storages;
- Reducing the losses within the Murray and Murrumbidgee irrigation systems;
- Reducing the annual availability of water for irrigation.

In the preparation of options the Inquiry targeted the use of water efficiency savings as the primary means of offsetting the agricultural and environmental impacts on the Murray and Murrumbidgee systems as a result of environmental flows for the Snowy River.

The Inquiry identified a pool of potential water savings of 140 GL. These savings included the following:<sup>14</sup>

- Reduction of irrigation system losses – the reduction of irrigation system losses was considered critical in freeing up water for environmental flows. Losses can be separated into three categories. (1) reduced losses in the storage and delivery of water from headworks storages to the major irrigation offtakes; (2) reduced losses within the distribution systems in the supply of water from the major river offtakes to farms; and

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<sup>12</sup> Snowy Water Inquiry, *Appendix of Resource Materials, Part 2*, 11 September 1998, at 1.

<sup>13</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report. Submitted to the Governments of New South Wales and Victoria*. Robert Webster, Commissioner, 23 October 1998, at 57.

<sup>14</sup> Snowy Water Inquiry, *Appendix of Resource Materials, Part 2*, 11 September 1998, at 4.



(3) improved use of water and reduced losses on farms.

- Reduction of losses within irrigation systems – losses within distribution systems which supply water from river off-takes to farm outlets are relatively large. Most of these losses occur in the large gravity fed open channel systems that supply farmland over an area greater than 1 million hectares<sup>3</sup> within NSW and Victoria. Losses are in the order of 20% and 30% of diversions from river offtakes in these systems. These losses result from: seepage; leakage; evaporation; escapes; theft and spills.
- Reduction of on farm losses – major opportunities exist for on-farm savings through the adoption of automatic irrigation technology, improved irrigation management of crops and pastures, drainage recycling and the introduction of micro irrigation systems for horticulture.

Table 2 below indicates those projects which would have a reasonable probability of implementation and which are likely to be economically viable, as identified by the Snowy Inquiry. The Inquiry assumed that a project would be economically viable if the cost of achieving water savings was less than the market value for the permanent trade of water. However, the Snowy Inquiry also noted that there was competition for these water savings by local irrigation communities, who were also seeking access to the savings.

**Table 2: Potential Water Efficiency Savings<sup>15</sup>**

Potential Savings	Flow Available GL	Cost of Recovery \$M
Government proportion of savings from Murray Irrigation Limited.	30	No additional cost
Escape controls in Colleambally	12	2.3
Channel flow control software in the Goulburn Murray Irrigation District (Vic)	10	2.1
Replace and rehabilitate private diversion meters in Sunraysia district (Vic)	8	2.5
Menindee Lakes (works to reduce evaporation losses)	22	15.5
Remote control regulator in the Goulburn Murray Irrigation District (Vic)	15	6.2

<sup>15</sup>

Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 72.

On farm drainage recycling	21.5	6.9
Escape loss control in Murrumbidgee Irrigation Area	8.5	3.6
Murray River wetland regulators	8	3.1
Purchase of entitlements/reduce diversions/other savings projects	5	
<b>Total</b>	<b>140.1</b>	<b>44.4</b>

The Snowy Inquiry noted that a detailed review of all the above listed water saving projects was required. However, although there is considerable uncertainty with the estimates, the Inquiry noted that the conservative approach to calculating savings and costs should allow Governments to make 'in principle' decisions on the level of savings that can and should be achieved without waiting for further studies to be finalised.

Assuming it has the support of Governments, the implementation of water efficiency projects is expected to take up to five years to complete. In addition, the works required to release environmental flows will take several years to complete. The Inquiry identified three options for the implementation of environmental flows. These were:<sup>16</sup>

- Make an 'in principle' decision on the level of savings that can be obtained but only implement environmental flows as the efficiency savings works are completed and the savings clearly demonstrated. At the end of five years, the full agreed environmental flow would be provided irrespective of the status of the efficiency savings program. This would provide an incentive to find and complete the works;
- Immediately implement environmental flows upon corporatisation of the Scheme with the water sourced on an interim basis from the 'underdraw' currently held;
- As for the second alternative, except that water would be sourced from a reduction of irrigation diversions during the interim period until the efficiency works were completed. This would also provide a strong incentive to find and complete efficiency savings works.

The Inquiry favoured the first alternative.

## 7 OPTIONS FOR REFORM

As part of its Terms of Reference the Inquiry was required to develop a range of comprehensive, fully costed options to address the environmental issues arising from the operation of the Scheme. In response, the Inquiry developed 23 options which covered different geographical areas affected by the Scheme. The Inquiry further refined these options into seven 'composite options'.

<sup>16</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 75.

The Inquiry noted that the following key factors must be taken into account when determining a solution for the Snowy River and associated streams:<sup>17</sup>

- Significant environmental gain for the river systems must be achieved;
- Significant reduction of water wastage in irrigation areas must be addressed;
- The cost impact on agriculture must be minimal because of its significant economic contribution to the community (apart from the opportunity cost of potential growth of industry);
- The impact on the hydro-electricity generator must be manageable;
- The capital cost impact on the Governments must be reasonable in terms of the return benefits to the environment and the community.

In addition, the Inquiry developed a number of basic propositions on which its analysis was based. These included:<sup>18</sup>

- The environmental condition of the rivers and streams reviewed would continue to deteriorate without action to sustain or improve their current condition;
- The Snowy and other rivers could be restored to provide different sets of environmental, economic, social and heritage values, depending on community priority values and on the amount of additional flow and other catchment and river management measures;
- Additional water for the Snowy River below Jindabyne would result in reduced water releases to the west;
- All releases on other rivers and on the Snowy River above Jindabyne would impact on electricity generation rather than flows in the western rivers;
- Savings of up to 135 GL in the western water distribution systems could be made and returned to the Snowy without affecting the environmental condition of either the Murray or Murrumbidgee rivers, or irrigation diversions;
- The competition for savings will be intense, with strong efforts made to keep the water to the west in order to ease the pressure to reduce the diversions to environmental needs or to expand irrigation developments.
- All allocations to the Snowy River over and above a 15% additional flow would require an offsetting reduction in irrigation diversions.

The Inquiry Commissioner, Robert Webster, favoured composite option D, and considered that this option achieved the key guiding factors as noted above. This favoured option would result in a 15% increase additional flow to the Snowy River.

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<sup>17</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 7.

<sup>18</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 11.

The seven options are summarised below, and are also summarised in Table 3.

### **7.1 Composite Option A: Sustain Current Environmental Conditions in Rivers in the Inquiry Area**

The environmental objective of this option is to sustain, in the long term, the current environmental conditions of the rivers and streams in the Inquiry area. Additional flows of 38 GL per year achieved by decommissioning the Mowamba aqueduct would provide the necessary flow for the Snowy River below Jindabyne Dam. This flow would be sourced from ‘above target’ water and would need to be offset by efficiency savings in the western rivers to avoid impacts on the irrigation industry. Additional flows of 15 GL per year from Tantangara Dam would provide the necessary flow for the Upper Murrumbidgee River.

Water savings would not be able to be provided for in severe drought years, estimated to occur four years in 100. Environmental flows during these years would be reduced to compensate for this.

### **7.2 Composite Option B: Improve Environmental Conditions in Rivers Downstream of the River**

The environmental objective of this option is: to improve the environmental condition of the Snowy River below Jindabyne Dam by providing minimum habitat utilisation, flushing and channel maintenance flows; to improve the environmental condition in the upper Murrumbidgee River and aid the recovery of threatened fish species by providing minimum habitat utilisation and flushing flows; to sustain in the long term, current environmental conditions of all other rivers and streams in the Inquiry area.

This option would involve an additional release to the Snowy River of 102 GL above option A (for a total additional release of 140 GL) from Jindabyne Dam, with releases mimicking natural seasonal patterns. A maximum flow of 168 GL is proposed if needed, for additional habitat utilisation flows or a flushing flow.

In the Snowy River below Jindabyne Dam, the habitat is expected to improve to approximate a ‘moderately modified’ condition in seven of the eight reaches. In the upper Murrumbidgee River, environmental condition is expected to also improve to a ‘moderately modified’ river. The habitat for native fish species is improved.

Water security to the west need not be significantly reduced with this option, provided the commitment to saving 135 GL is made. Murrumbidgee average supplies would be reduced by 5 GL. Water savings would not be able to be provided for in severe drought years, estimated to occur four years in 100. Environmental flows during these years would be reduced to compensate for this.

### Composite Option C: Further Improve Environmental Conditions in Rivers Downstream of the Scheme.

The environmental objectives of this option are: to further improve the environmental condition of the Snowy River below Jindabyne Dam by providing minimum habitat utilisation and additional flushing and channel maintenance flows; to further improve the environmental condition in the upper Murrumbidgee River and aid the recovery of threatened fish species by providing minimum habitat utilisation and additional flushing flows; to sustain, in the long term, current environmental conditions of all other rivers and streams in the Inquiry area.

This option involves an additional release of 160 GL above composite option A, for a total additional release of 198 GL from Jindabyne Dam, with releases mimicking natural seasonal flows. The Mowamba aqueduct would be retained as it would be feasible to install a small power station on the dam outlet. The proposed maximum flow for releases in the Snowy River below Jindabyne Dam would be 238 GL, if needed, for additional minimum habitat utilisation flows or a flushing flow.

Murray River offtakes or usage in both NSW and Victoria would be reduced by approximately 19 GL / year. Murrumbidgee average supplies would be reduced by approximately 23 GL. There would be a reduction in the level of assured water releases to the Murray Darling Basin Commission and Department of Land and Water Conservation storages. Water savings would not be fully available in severe drought years. Irrigation diversions would be further reduced if the maximum flow provision was required.

### **7.3 Composite Option D: Improve Conservation Values including the Environment of High Montane Rivers**

The environmental objectives of this option are: to improve the environmental condition of the Snowy River below Jindabyne Dam by providing minimum habitat utilisation, flushing and channel maintenance flows; to further improve the environmental condition in the upper Murrumbidgee River by providing minimum habitat utilisation and additional flushing flows; to sustain and improve the environmental condition of key upland montane rivers and streams; to provide the potential to aid the recovery of a number of threatened species including trout cod and Macquarie perch, leafy anchor plant, corroboree frog and spotted tree frog; to sustain, in the long term, current environmental conditions of all rivers and streams in the Inquiry area.

With this option Snowy River releases remain the same as composite option B (for a total additional release of 140 GL) from Jindabyne Dam, with releases mimicking natural seasonal patterns. Snowy River flow at Jindabyne Dam would increase to 10% of average natural flow, and would increase to 15% at Jindabyne Gorge with the contribution of the Mowamba River. At Orbst average natural flow would increase to 60% of average natural flow. An additional release of 14 GL to the upper Murrumbidgee River above composite option B (for a total additional release of 44 GL) from Tantangara Dam would result in a total flow of 15% of average natural flow at the Dam. An additional release of 20 GL (10% of average natural flow) from Geehi Dam or the aqueducts would restore connection to the

high montane catchments. For the upper Snowy River above Jindabyne Dam the option provides for additional flows of 32 GL and reconnecting the Snowy River headwaters. Guthega Power Station becomes a 'run of the river' power station, thereby changing the flow regime of the Snowy River.

The proposed maximum flow in the Snowy River below Jindabyne Dam is 168 GL if needed, which is an additional 28 GL above the 140 GL initial release, for additional minimum habitat utilisation flows or a flushing flow.

The expected environmental outcomes of this option are as follows. In the Snowy River below Jindabyne Dam, habitat condition is expected to improve to approximate a 'moderately modified' condition in seven of the eight reaches. In the upper Murrumbidgee River, environmental condition is expected to further improve as a 'moderately modified' river above composite option B. The habitat for native fish species is further improved, and, as a result, total and native fish species abundance and native fish species richness are expected to improve. In the Geehi River below Geehi Dam, environmental condition is expected to improve to that of a 'moderately modified' river. The condition of the upper Swampy Plain River is also likely to improve. These improvements provide the potential to aid the recovery of threatened species including trout cod, Macquarie perch and the spotted tree frog. In the upper Snowy River, environmental condition is expected to improve to that of a 'moderately modified' river in two of the three reaches and 'moderately modified' to near natural river in the second of the three reaches.

Water security to the west need not be significantly reduced by this option, provided a commitment to the savings of 135 GL is made. Water savings would not be fully available in severe drought years, and in these circumstances environmental flows would not be made available.

#### **7.4 Composite Option E: Further Improve Conservation Values, Extending the Area of High Montane Rivers.**

The environmental objectives of this option are: to improve the condition of the Snowy River below Jindabyne Dam, and the upper Murrumbidgee River below Tantangara Dam, by providing minimum habitat utilisation, flushing and channel maintenance flows; to sustain and improve the environmental condition of upland montane rivers and streams; to provide the potential to aid the recovery of a number of threatened species including trout cod, Macquarie perch, leafy anchor plant, corroboree frog and spotted tree frog; to sustain, in the long term, current environmental conditions of all other rivers and streams in the Inquiry area.

Snowy River releases from Jindabyne Dam are as for option D (ie, total additional releases of 140 GL), plus an additional release of 13 GL to the upper Murrumbidgee River above option D from Tantangara Dam. Other releases would be from the Geehi River and Snowy River above Jindabyne Dam as for option D. There would also be additional flows of 43 GL from Tooma Dam for minimum habitat utilisation, flushing and channel maintenance flows.

The proposed maximum level for releases in the Snowy River below Jindabyne is 168 GL if needed, ie, an additional 28 GL above the 140 GL initial release.

No reduction to Murray water security would occur provided a commitment to achieve the water savings of 135 GL is made. Murrumbidgee average supplies would be reduced by a further 14 GL as a consequence of increased flows from Tooma Dam.

### **7.5 Composite Option F: Extend the Conservation Area of High Montane Rivers and Restore Pools in the Lower Snowy River.**

The environmental objectives of this option are: to improve the environmental condition of the Snowy River below Jindabyne Dam, and the upper Murrumbidgee River below Tantangara Dam, by providing minimum habitat utilisation, flushing and channel maintenance flows; to improve the river pool habitats in the Snowy River between Sandy Point and Marlo; to sustain and improve the environmental condition of upland montane rivers and streams; to provide the potential to aid the recover of a number of threatened and vulnerable fish, plant and frog species; to sustain, in the longer term, current environmental conditions of all other rivers and streams in the Inquiry area.

For the Snowy River, this option builds on composite option B. It requires an additional release of 116 GL, so that flows at Jindabyne Dam increase to 23% of average natural flow. It would be feasible to construct a small power station on Jindabyne Dam. Additional releases to the upper Murrumbidgee River, Geehi River and upper Snowy River are the same as for option D. In the Snowy River below Jindabyne Dam, the proposed maximum level for releases following the first review of the Snowy Water licence is 307 GL if needed. This represents an additional 51 GL above the 256 GL initial release, for additional channel maintenance flows in the Sandy Point and Orbost reaches of the river.

The strategy of this option for the Snowy River is to use a combination of physical in-stream works and channel maintenance flows to help restore long deep pools in the Sandy Point reach and alternating pool and bar bed forms in the Orbost reach of the river. The environmental condition in the Snowy is expected to improve, varying from that of 'moderately modified' to near natural condition from Jindabyne to the sea.

This option requires the water savings to be made in the western rivers and proposes that additional flows as identified above could come from reductions in diversions on the Murray and Murrumbidgee Rivers.

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**Composite Option G: Maintain and Incrementally Improve the Environmental Condition of all Rivers in the Inquiry Area.**

The environmental objectives of this option are: to improve the environmental condition of rivers and streams in the Inquiry area by providing minimum habitat utilisation and flushing flows; to further improve the environmental condition of the Snowy River below Jindabyne Dam by the provision of additional flow for channel maintenance purposes in the river reaches from the Dam to the Delegate River; to provide the potential to aid the recovery of threatened fish, frog and vegetation species.

This option builds on the current sustainable condition for all rivers in composite option A. Additional releases to the Snowy River below Jindabyne Dam total 140 GL, with releases mimicking natural seasonal patterns. Additional flows are provided for: in the upper Snowy River above Jindabyne Dam; in the upper Murrumbidgee River from Tantangara Dam; from Geehi Dam to restore connection to the high montane catchments; from Eucumbene Dam; from Tooma Dam; from Tumut Pond and Tumut 2 Dam for the Tumut River. The proposed maximum level for releases in the Snowy River below Jindabyne Dam following the first review of the Snowy water licence is 168 GL if needed (ie, an additional 28 GL above the allocation of 140 GL).

Water security to the west need not be reduced if the 140 GL of water efficiency savings are implemented. However, if efficiency savings are not undertaken then irrigation diversions would be reduced with an impact on agriculture.



**Table 3: Summary of Composite Options<sup>19</sup>**

<b>Composite Option</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
<b>7.6 Flows</b>							
Within Scheme (GL/yr)	15	30	44	96	152	152	169
Out of Scheme (GL/yr)	38	140	198	140	140	256	140
Provision for max flow (GL/yr)	8	20	40	20	140	51	140
<b>Costs-Water (\$M)</b>							
Catchment works	23	23	24	24	24	32	23
Water efficiency investmt	9	42	42	42	42	42	42
<b>Costs -Electricity (\$M)</b>							
Greenhouse abatement	6	23	35	41	53	70	49
Fuel substitution	6	36	54	54	67	98	64
Outlet works	1	22	32	27	27	38	27
<b>Costs-Economic (\$M)</b>							
Salinity	0	3	3	3	3	3	3
Agriculture	0	3	27	3	10	60	6
<b>Total Quantified Costs (\$M)</b>	<b>45</b>	<b>152</b>	<b>217</b>	<b>194</b>	<b>226</b>	<b>343</b>	<b>214</b>
<b>Benefits-Use Values (\$M)</b>							
Canoeing/rafting	0	3	3	3	3	4	3
Fishing	0	23	30	45	46	57	23
<b>Total Quantified Benefits (\$M)</b>	<b>0</b>	<b>26</b>	<b>33</b>	<b>48</b>	<b>49</b>	<b>61</b>	<b>26</b>
<b>Net Threshold Cost (\$M)</b>	<b>45</b>	<b>126</b>	<b>184</b>	<b>146</b>	<b>177</b>	<b>282</b>	<b>188</b>
<b>Net Additional Cost with Max Flow (\$M)</b>	<b>5</b>	<b>17</b>	<b>38</b>	<b>22</b>	<b>22</b>	<b>45</b>	<b>21</b>
Impact on Snowy Hydro (\$M)	28	83	119	108	130	188	121
<b>Additional Impact of Max Flow (\$M)</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>1</b>

Note: Composite Option D is the Snowy Water Inquiry Commissioner's Favoured Option.

<sup>19</sup> Snowy Water Inquiry, *Snowy Water Inquiry Final Report*. Submitted to the Governments of New South Wales and Victoria. Robert Webster, Commissioner, 23 October 1998, at 20.

## 8 RESPONSES TO AND SINCE THE SNOWY WATER INQUIRY

The Inquiry's favoured option of, amongst other things, returning 15% of the original flow of the Snowy River back to it, brought a mixed response. For instance, conservation groups demanded that 28% of the flows be restored. The director of the Total Environment Centre stated: "The Commissioner has clearly underestimated the passion that Australians have for restoring the Snowy River."<sup>20</sup> The Chief Executive of Snowy Hydro was reported to have said that only minimal flows should be restored because cutting water to the Scheme would reduce the environmentally friendly hydro-electricity generation, and increase greenhouse gas emissions from coal fired thermal power stations.<sup>21</sup>

Since the release of the Snowy Water Inquiry's Final Report, there has been constant 'debate' in the community and media on the appropriateness of restoring environmental flows to the Snowy. The issue is complicated by the fact that there are three governments who must agree on the final decision – the Victorian, NSW and Commonwealth, and any decision may impact on the drinking water of South Australia, so hence their Government has been active in the debate.

The Victorian Government holds office with the support of Independents, including Craig Ingram.<sup>22</sup> Mr Ingram was elected on a platform of restoring 28% of the Snowy's original flow. It has been reported that the Victorian Government will support Mr Ingram's campaign for returning 28% of original flow.<sup>23</sup>

Commonwealth Environment Minister Senator Hill has warned the Victorian and NSW governments that any increase in flow to the Snowy would have a devastating effect on the salinity levels and economic viability of the Murray-Darling River.<sup>24</sup> Senator Hill is reported to have asked: "Is [it in the national interest] to return it to the Snowy for some form of romantic connotation or is it to return it to the Murray, which is in a state of serious ecological health?"<sup>25</sup>

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<sup>20</sup> "Inquiry fails to pacify Snowy water warriors" in *The Sydney Morning Herald*, 24 October 1998.

<sup>21</sup> "Inquiry fails to pacify Snowy water warriors" in *The Sydney Morning Herald*, 24 October 1998.

<sup>22</sup> After the mid-December 1999 byelection for the seat of Burwood, the Victorian ALP hold 43 of the 88 Legislative Assembly seats, the Liberal National Party Coalition hold 42, and Independents hold 3.

<sup>23</sup> "Great divide splits Coalition in river battle's ebb and flow" in *The Australian*, 22 December 1999.

<sup>24</sup> "Great divide splits Coalition in river battle's ebb and flow" in *The Australian*, 22 December 1999.

<sup>25</sup> "Bracks, Hill clash on Snowy." In *The Australian*, 21 December 1999.

Senator Hill has also ordered an Environmental Impact Statement to be prepared on the implementation of the plan to corporatise the Snowy Mountains Hydro-Electric Authority: “The process will enable full examination of the proposal to increase environmental flows to the Snowy, with emphasis on how they might affect the future health of the Murray River.”<sup>26</sup> The EIS was expected to take six months to conclude, and specific issues to be addressed were stated to include:<sup>27</sup>

- Implications for management of the Murray-Darling Basin of changed water flows, including timing of flow regimes;
- A cost/benefit comparison (including environmental costs/benefits) of the alternative options for the use of water identified from efficiency savings;
- An analysis of how the construction and operation of works associated with the corporatisation might affect flow regimes;
- Consideration of social equity issues, including mitigation or compensation measures to offset or reduce any adverse impacts, particularly any inequities in relation to downstream communities.

Whilst the Commonwealth Environment Minister may not be convinced on the merits of returning flow to the Snowy River, some of his colleagues are. For instance, the Gippsland based Arts Minister the Hon Peter McGauran MP stated: “I strongly believe in a 28% flow for the Snowy immediately, and we have to make out our case just as the irrigators in the Murrumbidgee will be arguing the opposite.”<sup>28</sup> It has been reported that National and Liberal MPs representing the Murray Darling electorates have urged the States to accept a recommendation for an 11% flow in the Murray, based on efficiency savings in the west.<sup>29</sup>

The Rice Growers Association, whose members rely on irrigation water for their crop production, has rejected the push to restore Snowy environmental flows. The Association president was reported to have said: “there has been no evidence to show what should be a proper environmental flow for the Snowy.”, and concluded that if it was proved that the Snowy required more water, then that should be achieved through management and infrastructure operations rather than simply diverting irrigation water.<sup>30</sup>

The NSW Special Minister for State, the Hon John Della Bosca MLC, has said that NSW had not determined its final position on the level of flows it would restore. After a meeting

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<sup>26</sup> Senator the Hon Robert Hill, Minister for the Environment and Heritage, *Snowy Hydro Environmental Impact Statement, Media Release 20 January 2000.*

<sup>27</sup> Senator the Hon Robert Hill, Minister for the Environment and Heritage, *Snowy Hydro Environmental Impact Statement, Media Release 20 January 2000.*

<sup>28</sup> “Great divide splits Coalition in river battle’s ebb and flow” in *The Australian*, 22 December 1999.

<sup>29</sup> “Great divide splits Coalition in river battle’s ebb and flow” in *The Australian*, 22 December 1999.

<sup>30</sup> “Rice growers reject Snowy water moves” in *The Sydney Morning Herald*, 26 August 1999.

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with the Victorian Energy Minister in mid December 1999, the Ministers stated that the governments would be working towards a 1 April 2000 agreement on restoring some flow to the Snowy River.<sup>31</sup>

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<sup>31</sup> “Snowy’s future left high and dry.” In *The Australian*, 16 December 1999.