

**INQUIRY INTO THE CONTINUED PUBLIC OWNERSHIP
OF SNOWY HYDRO LIMITED**

Organisation: The National Trust of Australia
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Date Received: 30/06/2006

Theme:

Summary

SnowyHydro SnowyHydro - Inquiry into the Continued Public Ownership of Snowy Hydro Limited

From:
To: <snowyhydro@parliament.nsw.gov.au>
Date: 30/06/2006 3:19 PM
Subject: Inquiry into the Continued Public Ownership of Snowy Hydro Limited

Reverend the Hon Dr Gordon Moyes MLC
 Chair
 NSW Legislative Council's Select Committee
 On the continued public ownership of Snowy Hydro Limited
 NSW Parliament
 Macquarie Street
 SYDNEY NSW 2000

Dear Dr Moyes,

The National Trust regrets the late submission of the following and attached statements to the inquiry.

However, we strongly believe that the issues raised should be taken into account by the inquiry.

Again, please accept our apologies for the lateness of this submission.

Yours sincerely,

Graham Quint
 Deputy Conservation Director
 The National Trust of Australia (NSW)

26th June, 2006

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 Chair
 NSW Legislative Council's Select Committee
 on the continued public ownership of Snowy Hydro Limited
 NSW Parliament
 Macquarie Street
 SYDNEY NSW 2000

Dear Dr Moyes

While the National Trust appreciates that the urgency in considering the heritage issues has been dissipated to some extent by the Federal Government's decision not to proceed with this sale, nonetheless there are important matters relating to heritage which should be considered by the Legislative Council Committee's Inquiry.

The Kosciusko Alpine Areas Landscape Conservation Area was Classified and entered on the National Trust Register in 1977 for its scenic and scientific values. A copy of that Classification Report is included for the information of Committee members.

The National Trust is currently assessing the significance and appropriate boundaries for a listing on its Register of the Snowy Mountains Hydro-electric Scheme and a copy of the draft Classification Report is also included for your Committee's information.

In this short submission the Trust urges that the Committee consider a number of specific heritage issues: -

- The Snowy Mountains Scheme is iconic engineering infrastructure of national significance and, at least, some of the individual elements need to be acknowledged as such. There should be placement of appropriate covenants to ensure heritage assessments before any privatization or equivalent process is considered.

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 30 JUN 2006
 SELECT COMMITTEE
 SNOWY HYDRO

- In view of the likely historic, scientific and aesthetic significance of elements of the Scheme, there need to be statutory enforceable procedures in place for the decommissioning of plant and approval processes for any new works.
- In the consideration of these issues there needs to be full and effective community involvement rather than limited community consultation and, in this respect, there should be no argument for non-disclosure of information on commercial confidentiality grounds.

Thank you for the opportunity of bringing to the Committee's notice the concerns of the National Trust.

Yours sincerely,

Jacqui Goddard
Conservation Director

RECEIVED

30 JUN 2006

SELECT COMMITTEE

SNOWY HYDRO

The National Trust
of Australia (New South Wales)

26th June, 2006

Reverend the Hon Dr Gordon Moyes MLC

Chair

NSW Legislative Council's Select Committee
on the continued public ownership of Snowy Hydro Limited

NSW Parliament

Macquarie Street

SYDNEY NSW 2000

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- In view of the likely historic, scientific and aesthetic significance of elements of the Scheme, there need to be statutory enforceable procedures in place for the decommissioning of plant and approval processes for any new works.
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Yours sincerely,



Jacqui Goddard
Conservation Director

The National Trust is a not-for-profit, non-government, community-based organisation working to conserve our built, natural and cultural heritage.



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Location:	THREDBO (SOUTHERN TABLELANDS)	Name of Listing:	KOSCIUSKO ALPINE AREAS LANDSCAPE CONSERVATION AREA	Region:	SOUTH EASTERN
Proposer: Conservation Committee	Crown Land X	Freehold	Map Sheet: Kosciusko National Park (CMA)		
Date of Proposal: June 1977	Local Govt Area/s: Shires of Tumult, Snowy River, Tumbarumba		Owner/s: Crown Land (N.P. & W.S.)		
Suggested Category: CLASSIFIED					
Committee: LCC					
Council: APPROVED	19/9/77				

Reasons for Listing:

SCENIC: Outstanding scenic grandeur of vast alpine mountains and high plain for the most part above the tree line, containing Australia's highest peaks, glacial lakes and most extensive snowfields. Impressive views of vast distances and snowfields from vantage points contrast with fascinating displays of alpine wildflowers that form a veritable carpet across the valleys in summer.

SCIENTIFIC: The geomorphology, geology and ecology of the alpine environment.

Description:

The alpine areas in the vicinity of Kosciusko form the major alpine region of Australia. They comprise areas of high country of the Great Dividing Range, extending about 100 km north from the Victorian border on a generally north-south axis, and being no more than 20 km in width. The boundary follows the 1,600 m contour, this being the lower limit of the tree line. The selection of this boundary does not imply that areas below this boundary are not worthy of classification.

The area within this boundary, although primarily alpine, contains some sub-alpine plant communities.

Recommendations:

That strict control of use of the area should be aimed at conserving this important biological resource.

Bibliography:

Plan of Management of the National Park. N.P. & W.S. 1974.
 "The High Country". Viewpoint Series No. 4. A.C.F. 1969.
 "Alpine Plants of Australia". Thistle Y. Harris, Angus & Robertson. 1967.
 "Flowers of the Australian Alps". Nuri Meiss, Writers Press. 1967.

Scenic:

The high country is a region of impressive scenic grandeur. Vantage points offer vast panoramas with the steeply descending slopes to the west of the main range being an outstanding feature.

The Snowy Mountains are snow-capped from about June to October, when conditions are usually ideal for cross-country skiing on the plateau and ski-tuns on the steeper slopes, notably at Thredbo, Smiggin Holes and Perisher Valley. During the summer, walking and riding are popular ways to see the beauty of the ranges and the flower-strewn alpine slopes, while streams provide good trout fishing.

Although the region is predominantly one of mountains and snow, the abundance of wildflowers in the short growing summer season is remarkable. The first flowers begin to appear by the end of November and by January the vast slopes are awash with colour. The delicacy of appearance of the alpine flowers belies their ability to withstand the extremes of bitterly cold winds and fierce sun. The scene is dominated by the white and silver snow daisies (Celmisia longifolia), the yellow and orange pompos of Billy Butrons (Craspedia), and the satin white Monita Australasica, a masterpiece in miniature, which carpets the ground as the snow patches continue to thaw. Over rugged peaks, glacial lakes, cascading streams, and expanse of high plain, comes a slow change from summer heat to winter snow but yet of sudden change, from clear azure sky to enveloping mists and ominous dark clouds, from soft breeze to howling blizzard. Poet "Banjo" Paterson caught the spirit of the high country in "The Man from Snowy River"

... where the pine clad ridges raise
their corn and rugged battlements on high,
where the air is clear as crystal, and the white stars
fairly blaze
At midnight in the cold and frosty sky'.

APPENDIX BDescription:

The Australian Alpine area lies on a plateau. This large area of relatively flat land results in more soil and less exposed rock than in European alpine areas enabling it to support vast expanses of plant communities. The true alpine area is above the tree line which varies from between 1600 m and 2000 m. The Trust has adopted the 1600 m contour as the boundary for the purposes of this classified listing.

The classified area encompasses the State's most extensive snowfields, the headwaters of the major streams of the Snowy, Tumut and Murray River systems. It extends over an area of 760 sq. km.

The alpine areas are situated within Kosciusko National Park. Mt. Kosciusko, Australia's highest peak (2,229 m) stands in the southern section of the high country. Other peaks are Mt. Townsend (2,210 m) Mt. Iwynan (2,196 m) and Ramshead (2,191 m).

APPENDIX B (continued)

Several lakes and tarns are situated in the high country. Blue Lake at the foot of Mt. Wynnham is the largest and deepest; Lake Albina, with the precipitous walls of Mullera Peak to the south, is dammed by glacial deposits; Club Lake is shallow and Lake Cootapatamba is small and lies to the south of the summit.

To the west of the high country, the land falls away rapidly to the Murray River, which flows generally northerly in this area before commencing its long run to the west. The Snowy River runs north-easterly from the Kosciuszko area in a deep gorge between the Snowy and Ramshead Ranges. It is harnessed by dams at Guthega, Island Bend and Jindabyne, before swinging away to the Victorian border.

The alpine region was the scene of the largest single engineering project ever undertaken in Australia. Under the Snowy Mountains Hydro-electric Scheme, the gigantic task of diverting the eastward-flowing streams of the alpine areas westward into the Murray-Murrumbidgee River systems was undertaken, the water so diverted being used for the generation of electrical power.

APPENDIX C

Geology

Granite is the predominant rock of the Kosciuszko region although some of Ordovician sediments and lava flows of various ages remain.

Granite was intruded beneath the surface in Palaeozoic time and after various uplifts and long periods of erosion became exposed and sculptured at the surface to form the present higher summits. The Kosciuszko uplift in Tertiary time lifted the whole area and several lava flows were associated. These earth movements and volcanic activity were followed by a period of glaciation which left the higher summit rocky and rugged, the valleys gorged into U shapes and numerous alpine lakes in rock hollows or blocked by moraine material.

APPENDIX D

Flora and Fauna

The alpine area is the only part of the State having permanent snow. The climate is a true alpine one, characterised by extreme temperature differences, prolonged periods of cold and abundant moisture. Alpine humus and peats are the main soil types.

During the short alpine summer life is exceptionally abundant. The activity of the fauna and the budding, blooming and seeding of the plants create a sense of urgency.

The vegetation consists of predominantly tussock grasslands and herbfields with smaller areas of heaths, bogs, ferns, feldmark and snowpatch. The greater part of the alpine tract is occupied by herbfields. Snow grasses predominate, while the other plants are almost entirely small herbs. The white buttercups (*Ranunculus anemoneus*) follow the first of the melting snows. Vivid patches of white, pink and purple plants (*Euphrasia*) form a dot the area, while the fascinating pineapple plant (*Asplenium alpinum*) forms a silver carpet with brilliant highly packed red fruits.

The feldmark (*Ajaleldmark*) vegetation is found on the most exposed and windswept tops. In the swiftly running melt-water the almost translucent alpine marsh marigold (*Caltha introloba*) opens its pale pink petals while the fragile blue-veined flowers of the tulip-like Gentian grows nearby. Mat plants include edelweiss (*Leucantha rubigena*) with grey foliage bearing tiny white flowers, and the intensely sweet scented, ivory coloured *Stackhousia*

Kosciusko Alpine Areas

APPENDIX D (continued)

The water generally undulating slopes, known as the fens, are favoured by buttercups (*Ranunculus*), stary white flowers of the purslane (*Neopaxia australasica*) and Billy Buttons (*Craspedia uniflora*).

The bogs are raised patches of the wetter areas supporting a very rich vegetation which features spagnum moss, the cream spikes of *Richea* and the deep pink of the *Veiliger* plant (*Seylidium grammifolium*).

Sod-tussock grassland fringe the raised bogs where several varieties of *Buttercup*, *Violet* and *Kunzea* thrive.

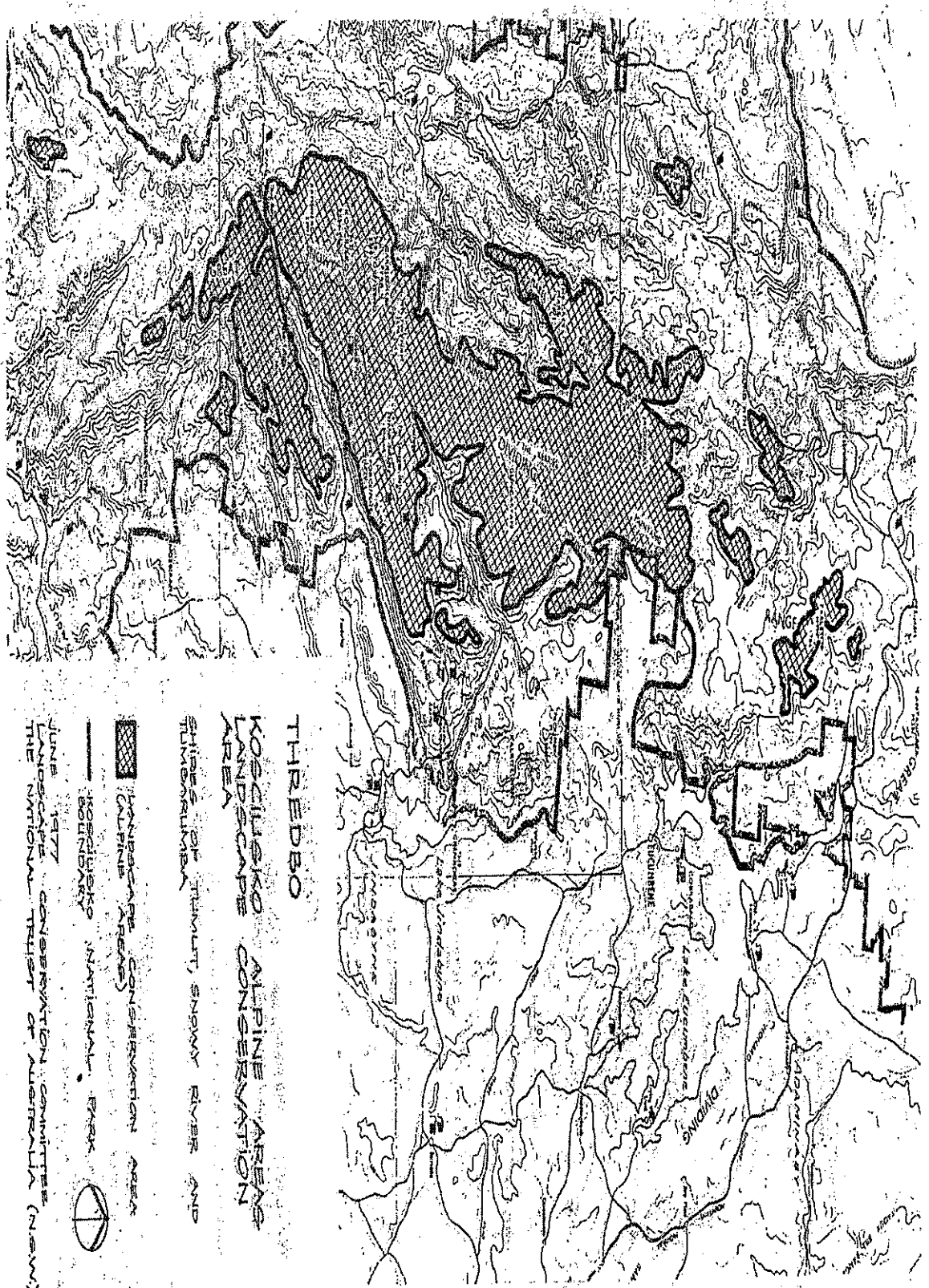
The heathlands associations favour more protected areas, rocky banks, along water courses and glacial moraines. The aromatic mint bush (*Prostanthera cuneata*) spreads itself over the rocks in elegant bands, while the highlight is the Rice Flower (*Primula leucostoma*) bearing beautiful pale pink clusters of flowers. Dense thickets of the bright yellow *Boslaea* also grow in these areas.

The snow gum (*E. niphophila*) borders the alpine country. Unprotected in this harsh environment it is dwarfed, stunted and tortured, the twisted stems of the snow gum with their satiny sheen are mottled with rich reds, apricots and lush greens.

Verticillates are relatively few in the alpine area, but there is a rich insect fauna. It is interesting to observe that a large proportion of the energy entering alpine communities is in the form of flying insects, pollen and seeds carried by winds from lower altitudes. Material is trapped in the snowfields and held until the thaw. The material is not consumed by the scavengers of the alpine area, flows into the melt-water stream, and sustains stream organisms on its return to the lowlands.

During the summer the mountains provide favourable habitat for montane distribution of the Bogong Moth (*Agrotis fontana*). The moth is found clustered in vast numbers in the granite caves of the mountain peaks. In the past aborigines gathered in large groups to feast on the moth.

A colourful inhabitant of the Sphagnum bogs is the glossy yellow and black striped *Coryoboree Frog* (*Pseudophryne corroboree*). Its habitat is restricted to the mountains of southern N.S.W. above the snow line.





NATIONAL TRUST OF AUSTRALIA (NSW) CLASSIFICATION REPORT

SUBURB: Cooma (also Adaminaby, Mt. Kosciuszko, Tumut) POSTCODE:	ITEM NAME: The Snowy Mountains Hydro-Electric Scheme	ADDRESS: South-eastern NSW (see below)
----------------------------------------------------------------------------------------------	---------------------------------------------------------------------------	------------------------------------------------------------

LGA/s:	Snowy River Tumut	
ABORIGINAL NATION/s:	Ngarigo Wolgalu	
OWNER/s:	Snowy Hydro Limited Level 25, Norwich House 6-10 O'Connell Street Sydney NSW 2000	Snowy Hydro Limited GPO Box 4351 Sydney NSW 2001
COMMITTEE/s:	INDUSTRIAL HERITAGE COMMITTEE	
AUTHOR/s:	Compiled from Bibliography	
DATE OF PROPOSAL:	June, 2006	APPROVED:

STATEMENT OF SIGNIFICANCE:

The Snowy Mountains Scheme (SMS) was the largest engineering scheme ever undertaken in Australia and is a nationally and internationally significant engineering achievement. The Scheme as a whole, and many individual components, exhibit technical and design achievement of the highest order. In 1967, the American Society of Civil Engineers rated the Snowy Mountains Scheme as one of the seven civil engineering wonders of the modern world. It remains, as an operational hydro-electric scheme, is the largest and most complex example of such schemes in Australia.

The Snowy Scheme dominated the Australian development and construction scene for several decades after WWII and was responsible for permanent changes to prevailing workplace practices and the industrial relations environment in Australia.

The Scheme employed over 100,000 people, from thirty different nationalities, and played a significant role in the history of Australia's post-World War Two migration by providing employment for European refugees and migrants. The Authority directly recruited over 60,000 workers from Europe as part of the National commitment to the post-war relocation of 'displaced people'.

The scale and duration of the Snowy Scheme was unique in Australian experience. It placed many thousands of workers in living and working conditions that were unusual and are of

exceptional interest. Many of the features of the scheme, such as its scale and the nature of individual components, for example the underground power stations and trans-mountain tunnels, are rare, and are likely to remain so.

The Snowy Scheme juxtaposes major engineering objects on a distinctive, mountain landscape, thus adding to the complex layers of human occupation of an area of considerable significance for its natural and cultural values.

The Scheme also had a major impact in accelerating regional development in the surrounding towns and in the development of the Australian ski fields.

The Snowy Scheme is strongly symbolic for large parts of the Australian community and is held in special regard, especially by the large community of former Snowy workers and their families who lived and worked there. For many, the associations of the Snowy Scheme are intertwined with their experience of migration from post-war Europe, and the start of a new life in Australia. For some local communities, who were moved and felt or still feel dispossessed by the Scheme, the cultural memories are different though equally powerful.

The Snowy Scheme is closely associated with a number of prominent Australians who were responsible for its political existence or its physical completion. Prominent among them are Sir William Hudson, Prime Minister Ben Chifley, Nelson Lemmon, O.T. Olsen, W.J. McKell, T.A. Lang, and William Spooner.

HISTORY:

In a dry continent, water produced by the melting snows of the high country, was regarded as an extremely valuable resource and a number of proposals were put forward from the nineteenth century onwards to better utilise that resource.

In 1884 the NSW Surveyor-General, P.F. Adams, proposed to a Royal Commission the diversion of Snowy River water to the Murrumbidgee by open canal. Almost forty years later, in 1920, William Corin, Chief Electrical Engineer with the NSW Department of Public Works, proposed the construction of a hydro-electric power station on the Snowy downstream of Jindabyne and, in 1926, T.W. Keele of the Metropolitan Water Sewerage and Drainage Board, Sydney, suggested diverting the Snowy River water by tunnels and aqueducts to Canberra and Sydney. The Snowy Mountains Hydro-electric Development League was formed in 1936 to promote the utilisation of hydro-electric power to assist the development of the Monaro and South Coast of NSW. A report commissioned by the NSW Government in 1937, however, suggested that any hydro-power station in the Snowys would only be viable if it were to provide power to Sydney, and recommended a 250,000 kW scheme in much the same location as Corin's proposal.

The Snowy River Investigation Committee established by the NSW Government had, in 1944, recommended the diversion of the Snowy River at Jindabyne to join the Murrumbidgee River north of Cooma, for the sole purpose of boosting irrigation downstream on that river. Victoria wanted the water to go to the Murray River, initially to improve river navigation and irrigation, and the Commonwealth wanted to see power generation as a major outcome.

A Commonwealth and States Snowy River Committee was established in 1944 to look at the various proposals in detail. A major catalyst in the final project was the 1946 report of O.T. Olsen of the State Electricity Commission of Victoria, recommending the generation of hydro-electricity as well as irrigation, and gave a coherent form to the Commonwealth's position. The Commonwealth was keen to pursue the project in the context of post-war reconstruction. The key aspects of post-war reconstruction were to include: the maintenance of full employment through public works; the promotion of economically viable agriculture; improving the economy by assisting manufacturing; and the use of immigration to stimulate overall development.

A Commonwealth / States Technical Committee was set up in 1947 to pursue the

proposal. The finally accepted plan, as presented to the Committee in November 1948, involved two distinct projects: the northern project diverting the waters of the Eucumbene, upper Tooma and the upper Murrumbidgee Rivers north under the Great Dividing Range and then via the Tumut River to the middle section of the Murrumbidgee; and the southern project diverting the waters of the upper Snowy River east under the Great Dividing range to the Murray River.

However, continued reluctance on the part of NSW to embrace the Scheme caused the Commonwealth to invoke its defence powers to put through legislation, giving it total control over the alpine headwaters and the development of the scheme. The Snowy Mountains Hydro-Electric Power Act came into force on 7 July 1949, bringing into being the Snowy Mountains Authority (SMA). Much of the area of the Scheme was located within the 500,000 hectare Kosciuszko State Park, established by an Act of the NSW Parliament in 1944 to facilitate protection of the mountain catchments (which had been damaged by stock grazing), and provide for conservation of, and public recreation in, the area. At the time the Scheme was commenced (when the concept of conservation was in its infancy in Australia), no explicit provision was made for the protection of the Park during construction activities. The original scheme was modified as experience was gained, and by the mid-1950s the number of power stations and dams was reduced (with no loss of output), and the two sections of the scheme were joined by a tunnel linking lake Eucumbene and Island Bend, allowing a more flexible use of the Snowy and Murrumbidgee waters.

After WWII, the United Nations Relief and Rehabilitation Administration asked the Australian Prime Minister, Ben Chifley, to take 100,000 homeless Europeans into his country. As many as 60,000 European Displaced Persons and migrants were directly recruited in Europe by the Snowy Authority or otherwise found their way to the Snowy Scheme (*McHugh 1999:24-26, 38; Collis 1998: 31*). Cooma became the railhead for the Scheme. Camps were set up initially at Jindabyne and near Kiandra as bases for road construction teams. Over 1600 kms of roads and tracks were completed. The Alpine Way, through Dead Horse Gap, was to have a direct influence on the development of the Thredbo resort in 1957 whilst the Scheme's immigrant workforce popularised skiing. (*Higgins page 9 in Freeman, P 1997, Ski Resorts heritage Study Vol. 2 Historical Overview*). The hazardous nature of the mountain road construction and use was recognised early by the Authority, and it became reputedly the first organisation in the world to fit its vehicles with seat belts and make their use compulsory, in 1960 (*Collis 1998: 92*).

The preliminary work necessary before design and construction work actually got underway included detailed trigonometric and geological surveying, and hydrological study to determine in detail the nature of stream flows across the Snowy. To establish early success, the Authority pressed ahead with the dam and power station at Guthega, independent of the two much larger Snowy-Tumut and Snowy-Murray components. This was built by the Norwegian firm of I F Selmer from 1951-1955.

In the case of the larger elements of the scheme, in an effort to satisfy the NSW irrigation interests along the Murrumbidgee, the Authority decided to give precedence to the Snowy-Tumut development in the northern end of the Snowys, which provided water to the Murrumbidgee, over the Snowy-Murray component of the Scheme to the south (*Collis 1998: 82*). The Snowy-Tumut development commenced in 1955 and while major components were completed progressively from 1959 (Tumut-1 Power Station), the last major component, Tumut-3 Power Station, was not completed until 1973. The Snowy-Murray development, much reduced from the initial design, was commenced in 1962, and all major components were completed by 1969.

Some 120 work camps and towns were built by the Authority and contractors over the 25 years life of the construction to house an estimated 100,000 men and many families. At the peak of construction, in 1959, there were 7,300 people working on the Snowy, overwhelmingly male. Camps ranged in size from survey camps for a few men, to small work camps such as the road building camp at Tooma Road, with 50 men, to large townships such as Junction Shaft, with 1,500 people and Cabramurra with 3,000.

The simplest camps were made up of army-surplus tents, being replaced at larger camps with iron Nissen huts and prefabricated timber huts built in Cooma. The Snowy Mountains Authority built some 700 demountable houses for use at construction camps, as well as the permanent cottages built at townships, 700 cottages being built in Cooma alone, many of which are still there. The cottages and barracks were all transportable, and moved from one construction site to another as work was completed.

Large townships were created both to re-house those displaced by dam construction, at Adaminaby and Jindabyne, and to be centres for Authority operations, as at Cabramurra, Khancoban, and Talbingo. Many residents were compulsorily removed from their land and homes during the construction of the Scheme. This led to a strong sense of loss and injustice among local Snowy families, best documented in the case of Adaminaby, where 101 buildings were moved to the new town in 1957, but other connections with the land were flooded by the rising waters. Similar local feelings are expressed, in a less publicised way, at other dam sites at Jindabyne, Khancoban Talbingo and Blowering.

The scheme resulted in the development of Australian engineering expertise, borrowing first from the US experience, with 103 Australian engineers being trained by the US Bureau of Reclamation from 1951-1961, then adapting and innovating to suit Australian conditions, such as in the development of rock-bolting to replace concrete lining in tunnels. The scheme, through the use of international engineering contractors, also introduced work and contractual practices unknown at the time in Australia. These included replacing single-shift day labour with multiple shifts and contracts based on work target estimates and fixed fees. Bonuses were offered for finishing on time and penalties applied for late completion. These changes spread more generally into the Australian post-war industrial environment and the nature of industrial relations had to change to accommodate the new environment. The work-changes on the Snowy were made to work largely through the good working relationship built up between arbitration commissioner Mr Justice S.A. (Stan) Taylor of the NSW Industrial Commission and NSW Australian Workers Union secretary, Charlie Oliver. Agreement to tougher working conditions may have been made easier for workers by the high levels of pay found on the Scheme, wages being two to three times the national average.

While international companies won all the first round of contracts, the second round saw the Theiss Brothers winning the Tooma Dam and Tooma-Tumut tunnel contracts, becoming the first Australian company to undertake large projects in the Scheme. Its success led to their later winning tenders for the construction of the Talbingo, Geehi, Deep Creek and Murray-2 Dams and the Murray -1 pressure tunnel, totalling a quarter of the Scheme by 1974. Other Australian firms benefited from the stimulus provided by the Scheme, such as Hume Ltd, who were able to expand by providing pipe for the Scheme from a factory established at Corryong.

The Scheme has had major impacts on some parts of Kosciuszko National Park. The move for the protection of the Snowy Mountains catchments from erosion, caused by grazing, was championed by Soil Conservation Commission E.S. Clayton, whose lobbying of the Premier W.J. McKell, and Minister of Lands, J. M. Tully, was influential in the establishment of the Kosciuszko State Park in 1944. Clayton subsequently worked closely with the Authority, and stimulated Hudson's strong support for the cessation of grazing in the high country. The Authority supported the campaign, spearheaded by Clayton, which in 1958 succeeded in stopping the renewal of leases in the high altitude areas (above 1370 metres). It was not until 1969 that grazing was finally abolished within the rest of the Park.

Rehabilitation and revegetation of the high country by the Soil Conservation Commission started in a small way in 1959, increasing considerably by 1962. Initial attempts utilised standard soil conservation solutions developed for agricultural lands, involving contour banks, rock-paved drains and flumes, and the sowing of European exotic grasses and clovers. By the late 1960s it was recognised that the use of exotic species was not a viable long-term solution in the high country, neither practically nor philosophically. Native plant propagation trials, started in 1967, were implemented from 1969. The new

techniques were introduced as the soil conservation and revegetation work moved north along the Main Range. The overall area needing such work extended from Mt Kosciuszko to the Bulls Peak area 35 km to the north, and 10 km east to the Ramshead and Perisher Ranges. By this time, Kosciuszko State Park had been renamed Kosciuszko National Park under the NSW National Parks and Wildlife Act 1967 and was managed by the National Parks and Wildlife Service formed under that legislation.

In 1977, the park was declared a World Biosphere Reserve under the UNESCO Man and the Biosphere program.

DESCRIPTION:

The Snowy Mountains Scheme is a dual purpose hydro-electric and irrigation development. It diverts water from the easterly flowing streams to release it on the west of the Great Dividing Range, through a series of trans-mountain tunnels. In so doing, it generates electricity (primarily for periods of peak energy demand) and provides water for irrigation. The Scheme was constructed over a 25 years, commencing in 1949 with the passing of the Snowy Mountains Hydro-electric Power Act and reaching completion in 1974.

The Scheme, as completed in 1974, features:

- 16 large dams of five different types: Rock-fill, Earth-fill, Concrete gravity, Concrete arch and Slab and buttress;
- 80 kilometres of aqueduct pipelines;
- 13 major tunnels totalling over 140 kilometres;
- 7 power stations - Murray 1, Murray 2, Guthega, Blowering, Tumut 1 (located 366 metres below ground level), Tumut 2 (located 244 metres below ground level), and Tumut 3. These power stations have 31 turbines with a total generating capacity of 3756 megawatts (MW).
- 2 pumping stations, comprising 5 pumping units
- 8 switching stations and control centres
- 3 towns to service the scheme
- sites of about 120 workcamps and former construction towns

The Scheme generates on average, 4500 gigawatt-hours per annum of electrical energy and providing 2360 GL of water annually for irrigation. In addition, the Scheme has had an impact on the region's infrastructure, employment patterns and urban and rural development. Cooma displays evidence of the influence of the Scheme on its planning and housing construction whilst Khancoban, Cabramurra and Talbingo are towns which owe their origins to the Scheme. Adaminaby and Jindabyne were relocated to new sites.

The Snowy Scheme has two main sections, the Snowy-Tumut and the Snowy-Murray developments, with some components operating in both sections. The Snowy-Tumut development can be summarised as follows: *Tantangara Reservoir feeds into Lake Eucumbene via the Murrumbidgee-Eucumbene Tunnel which flows to the Tumut Pond Reservoir via the Eucumbene-Tumut Tunnel, this tunnel also collects water from the Happy Jacks Pondage. Tumut Pond is also the outflow point for the Tooma-Tumut Tunnel, which collects water from Tooma Reservoir. From Tumut Pond water flows via the Tumut 1 Pressure Tunnel to the Tumut 1 Power Station, then through the Tumut 1 Tailwater Tunnel to the Tumut 2 Pondage, then via the Tumut 2 Pressure Tunnel to the Tumut 2 Power Station, through the Tumut 2 Tailwater Tunnel to the Talbingo Reservoir, to the Tumut 3 Power Station into the Jounama Pondage, into the Blowering Reservoir, to the Blowering Power Station before discharging into the Tumut River and eventually the Murrumbidgee River.*

Snowy-Murray development can be summarised as follows: *Lake Eucumbene feeds into the Snowy-Geehi Tunnel via the Eucumbene-Snowy Tunnel, the latter also collecting water from the Island Bend Pondage. The Pondage is also fed by water flowing down the Snowy River which has passed through the Guthega Pondage and Guthega Power Station. The Snowy-Geehi Tunnel either supplies water to or draws water from the Jindabyne-Island Bend Tunnel which connects to Lake Jindabyne. If water is drawn from the lake this is done using the Jindabyne Pumping Station. The Snowy-Geehi Tunnel feeds into the Geehi Reservoir which feeds the*

Murray 1 Pressure Tunnel which leads to the Murray 1 Power Station, then the Murray 2 Pondage, then via the Murray 2 Pressure Tunnel to the Murray 2 Power Station to the Khancoban Pondage which feeds the Swampy Plain River and eventually the Murray River.

The major permanent components are also linked to a range of minor permanent components including:

- aqueducts, which gather water and feed tunnels or dams;
- stream gauging stations;
- weather stations;
- snow courses, which manage snow drift;
- work camps and townsites; and
- huts and shelters.

The scheme has also resulted in a major cultural landscape that overlays large areas within Kosciuszko National Park.

BIBLIOGRAPHY / SOURCES:

Pearson, M and D Marshall 2000, Snowy Mountains Scheme: Scoping Study of the European Cultural Heritage, for the Australian Heritage Commission.

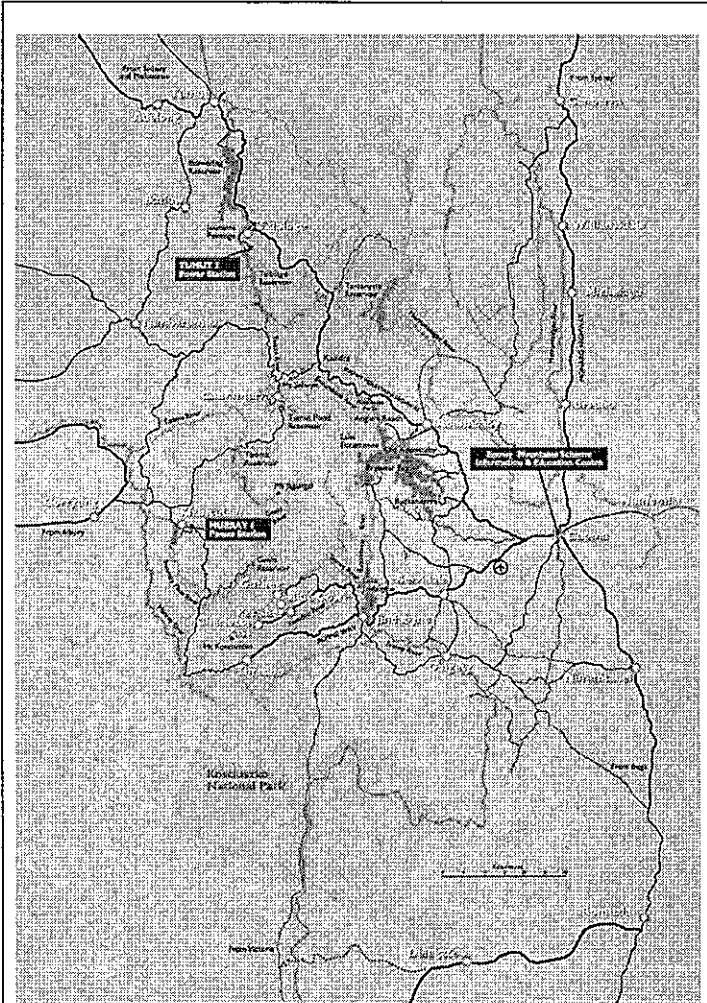
Register of the National Estate Database, Australian Heritage Database: www.deh.gov.au

Pearson & Marshall 2001

BOUNDARY OF LISTING / CURTILAGE:

About 460,000ha, Cabramurra, being an area bounded by a line commencing at the intersection of the Kosciuszko National Park and the Murray River at approximate AMG point 944779, then southerly via the park boundary to its intersection with Snowy Creek, then directly to the intersection of AMG northing 5955200mN with the Snowy Mountains Authority Proclaimed Boundary (SMAPB) at approximate AMG point 115552, then south easterly via that boundary to its intersection with the Kosciuszko National Park at approximate AMG point 259526, then northerly via the park boundary to its intersection with the Thredbo River, then north-easterly and southerly via the right bank of the Thredbo River and the Full Supply Level (FSL) of Lake Jindabyne to Jindabyne Dam (including the whole of the dam wall), then northerly via the FSL of the eastern side of Lake Jindabyne to its intersection with the park boundary (approximate AMG point 468836), then northerly via the park boundary to its intersection with AMG northing 5999400mN (approximate AMG point 456994), then via straight lines joining the following AMG points: 464993, 464984, 476984, 476990, then directly to the intersection of the FSL of Lake Eucumbene and AMG easting 646800mE (approximate AMG point 468005), then easterly and northerly via the FSL of Lake Eucumbene to its intersection with the Kosciuszko National Park boundary (approximate AMG point 482189), then north easterly via the park boundary and the A.C.T. border to the intersection with the SMAPB (approximate AMG point 610551), then north westerly via the SMAPB to its intersection with the Tumut River (approximate AMG point 141846), then upstream via the left bank of Tumut River to Blowering Dam, then southerly via the FSL of the western side of Blowering Reservoir, Jounama Pondage and Talbingo Reservoir to its intersection with the Kosciuszko National Park boundary at approximate AMG point 174568, then southerly via the park boundary to its intersection with AMG northing 5992300mN (approximate AMG point 022923), then directly to the intersection of the western side of Swampy Plain River with AMG northing 5992300mN (approximate AMG point 990923), then southerly via the western side of Swampy Plain River, Khancoban Pondage and Swampy Plain River to the Kosciuszko National Park boundary, then southerly via the park boundary to the point of commencement.

SITE PLAN:



Map of the Snowy Mountains Scheme area and Kosciuszko National Park
(Source: www.snowyhydro.com.au).

PHOTOGRAPHS:



Tumut 3 Power Station
(Source: www.snowyhydro.com.au)



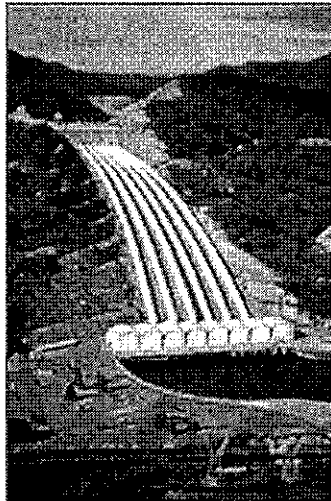
Geehi Tunnel
(Source: www.snowyhydro.com.au)



Talbingo Dam
(Source: www.snowyhydro.com.au)



Murray 1 Power Station
(Source: www.snowyhydro.com.au)



Tumut 3 Power Station
(Source: www.snowyhydro.com.au)