Abstracts only

The Archaeological Significance of Buchan Caves

Josephine Flood

The limestone caves of Buchan have proved highly significant in revealing both past culture and environment in south-eastern Australia. Rich faunal deposits have been excavated by Norman Wakefield at Pyramids Cave, Josephine Flood and Jeannette Hope at Cloggs Cave and Paul Ossa at New Guinea II. These provide a consistent, dated sequence of fauna spanning the last thirty millennia. Cloggs Cave is of particular importance in the debate about the extinction of megafauna in Australia for its lowest layer contains a mandible of the extinct short-faced kangaroo *Sthenurus orientalis*, dated to 21,700 +1250/ -1050 BP (ANU- 1220).(NB this is a revision of the previously published radiocarbon age). This is one of only three firmly dated 'late' occurrences of megafauna in Australia. Rock art is extremely rare in Victoria but Buchan caves contain two examples, macaroni-style engravings in New Guinea II and a painting at Cloggs Cave (analysis of pigment from the latter show it is natural pigment mixed with animal fat and therefore of Aboriginal, not modern origin). Prehistoric artefacts have also been found in several caves in the Buchan region (those excavated by Flood, Ossa and by the late Alexander Gallus (in East Buchan II) are now in the National Museum of Victoria in Melbourne). Twenty millennia ago Cloggs Cave and New Guinea II were occupied by hunter-gatherers, using stone and bone tools to manufacture wooden artefacts and skin cloaks. The oldest human occupation yet discovered dates to about 21,000 years at New Guinea II, a similar antiquity to the oldest artefacts excavated by Flood in the small, granite rock-shelter of Birrigai in the ACT. This indicated human presence at least on the fringes of the Snowy Mountains at the height of the last ice age. Aboriginal people have lived in the region continuously ever since, as much younger tool types attest in Cloggs Cave, New Guinea II and EB II.

These findings show the tremendous potential cultural and scientific significance of even small, unprepossessing caves and rock-shelters, and there is a need for much further research to be carried out in southeastern Australia. Regarding site protection, none of these caves or rock-shelters are suitable for public entry and metal grilles and padlocked gates are in place at most of them, but they do need regular monitoring by site managers to prevent damage from burrowing animals etc. Informative interpretive panels would also aid public education and understanding and the cause of Aboriginal reconciliation. I would be happy to provide the content for roadside signs in the region of New Guinea II and the Lower Snowy River open air campsites (near the NSW-Vic border) and for Cloggs Cave near the bridge from where the cave is visible.

Linaker landscape

John Hawker

The Buchan Caves Reserve is more than just limestone caves. The Reserve is greatly admired and valued for the impressive collection of exotic trees planted along Spring Creek Valley in amongst the indigenous Yellow Box, Manna Gum, and Blackwood and on the hillsides, the rare Buchan Blue Wattle. In 1929 Hugh Linaker prepared a landscape plan for the Reserve, providing a planting list, sketch of the avenue trees, and a rustic shade house. His plan showed predominantly exotic trees although natives were not excluded and included eucalypts, she-oaks and wattles. While the colourful deciduous trees have become a major tourist feature in autumn, the planting also includes many fine conifers; pines, cypress and redwoods. Linaker, born in Ballarat on 4 June 1872, was one of nine children. At the age of 14, he was apprenticed as a gardener to the Ballarat Gardens. After 14 years at Ballarat, he was awarded the post of curator of the Ararat Gardens out of 96 applicants. He held this position from 1901 to 1912, when he became Landscape Gardener at Mont Park Hospital for the Insane. Around 1933 he was appointed State Superintendent of Parks and Gardens. During his career Linaker was responsible from 1912 for the design and maintenance of the grounds of all mental hospitals in the State. He was also involved in the design of the grounds to the Shrine of Remembrance in 1933, the Yarra Boulevard beautification scheme Yarra Bend National Park and Mount Buffalo National Park. Linaker's advice was sought by many country municipalities for the planning of public parks and gardens including Ararat Botanic Gardens (Alexandra Gardens),

Alexandra Park, Stawell, Herbert Gardens, Box Hill, Princes Park, Maryborough, and the Pioneer Women's Memorial in the Domain. He planned the plantations for the model township of Yallourn and the Road Plantations on Geelong Road. He advised also on the gardens at Stonnington, Malvern, Carn Brea, Hawthorn and at Burnham Beeches, Kallista. In 1938 Linaker prepared a plan for the draining of Lake Augusta (now the sunken oval) at Castlemaine. Linaker was a frequent lecturer and an inaugural member of the Victorian Tree Planters Association formed in 1926. Hugh Linaker died on 10 October 1938 at the age of 66. Linaker is regarded by many as the leading landscape gardener of his generation in Victoria, and in one sense was a successor to William Guilfoyle.

Lighting for Darkness

Neil Kell & Andy Spate

Within the darkness of a cave – any light will have a dramatic affect. The issue is – how can we utilise this contrast between the natural environment of cave darkness and the introduction of artificial lighting technology? How much should be lit? And, further, how this can be done with minimal impact on the cave both in the short and long term? This presentation addresses some of the issues confronting those who light caves for public viewing including such issues as *lighting for access*, *lighting for atmosphere* and *lighting for protection* of the cave resource. It deals with practical philosophies for cave lighting emphasising sensible and low(er) cost approaches.

High intensity LED lighting

David Head

This Powerpoint presentation deals with high intensity LED lights being developed by Weidmuller Pty Ltd. It describes their properties and demonstrates a variety of LED fittings manufactured for cave use in Australia. Some of these have been used at Jenolan and Wombeyan caves and their use is being considered at other cave sites in Australia and South Korea. Examples of their use will be shown in the presentation during the Cave Lighting Workshop.

Karst environments in New South Wales: issues, directions and unevaluated karst values

Stephen Reilly & Russell Commins

Within New South Wales there are approximately 430 deposits of limestone or dolomite, most being less than 2 square kilometres in outcrop extent. About 100 of these deposits are cavernous and could be described as karst environments. Other deposits show little evidence of karstification on surface exposures but may contain significant groundwater dependant ecosystems (GDEs) or buried palaeokarst features, however this has not been assessed. There are also a small number of pseudokarst features of various origins. Although many of the largest and significant karst environments are contained within reserves, two thirds of NSW karst environments are located in privately owned land. Significant research and assessment of karst in NSW has been undertaken including a comprehensive database of caves developed by the Australian Speleological Federation, an NGO. Many of these studies are confined to a limited number of recognised karst sites or features. Numerous locations lack documented assessment of key karst values. An accurate state GIS karst layer that maps karst environments, key features, catchments, tenure and threatening processes has yet to be developed. The need for urgent further documentation of NSW's karst environments is supported by existing findings that indicate some of NSW's karsts are the most complexly evolved yet found and contain a high diversity of cave invertebrates with a high degree of endemism. Recent research confirms some caves at Jenolan Caves are 335 million years old, making them the world's oldest known enterable caves. To improve karst conservation outcomes in NSW there is a need to clarify, prioritise and address karst

issues and threatening processes. There is a need to undertake research and documentation of many karst environments, compiling the information in a GIS/database of NSW karst that may be utilised by state agencies and local governments who are involved in land use management and planning for private and public land. With many karsts located on private land there is a need to enlist owners in partnerships towards karst conservation through the provision of advice, conservation agreements and funding of conservation works. Some key karst environments would benefit if acquired into the state reservations system. In recognition of the importance of karst environments the State government has recently legislated to form a state Karst Management Advisory Committee (KMAC) and resourced a Karst Conservation Unit (KCU) within the Department of Environment and Conservation. KMAC has a strategic planning and advisory role, advising to the Government through the National Parks Advisory Committee. The KCU has been functional since July 2006 and has developed a work plan and is undertaking a range of projects in line with identified priorities. Only recently formed KMAC will to contribute advice and direction to the KCU. Current projects of the KCU are discussed along with some karst issues identified at a forum of karst managers and researchers held in March 2006.

Umphy and The Man

Ian Lewis

Umpherston's Cave is a prominent cenote in an attractive park on the approaches to Mt Gambier in the Limestone Coast of South Australia. Entry is free and visitors walking across the park are very surprised to see terraces of hydrangeas, lush curtains of ivy, two tall palm trees, possums, barbeques and a waterfall within the sinkhole. There are a number of important reasons behind this European presentation of a unique Australian natural geo-feature. Close to the site of the first settlement of the city in the 1830s, the cenote (and its hidden twin nearby) were initially part of the prosperous property of a prominent and innovative local farmer, James Umpherston, who in the 1880s decided to beautify it along the lines of an imperial garden with a dinghy on its sizeable lake. By the 1960s all this had been completely buried by industrial rubbish from the Forest Operations Mill which had taken over the old farm. The mill's Regional Administrator, Ken Norton, decided to clean and restore it. He led and motivated the large mill's Social Club for almost 20 years, sometimes in direct conflict with his employers and using company plant and equipment whenever they could get it to haul and clean out the cenote. The unexpected discovery of the original lost garden terraces at the bottom was a highlight. An enthusiastic, redoubtable and strongly ethical man, Ken had to deal determinedly with the mill politics and management issues generated by the staff involvement. Since the cenote was restored, Ken has devoted the last 18 years full-time since his retirement to maintaining and beautifying the park and gardens as a tribute to the forestry workers and for the greater community, for which he was recently awarded an OAM. He has now turned his energy to the hidden twin sinkhole….

Karst and pseudo-karst in Victoria: an overview

Dr Susan White

This paper will give an overview of the many caves and related landforms known in Victoria. Some are true karst but others are volcanic caves and pseudokarst. These features have scientific, recreation, aesthetic, conservation and education values and are an important part of the state's heritage. The karst and pseudokarst features are the result of the following natural processes: solution, precipitation, volcanism, weathering, piping, and wave action. Some karst is buried under the volcanic flows of western Victoria. Solution and precipitation, primarily of carbonate rocks is the single largest group. These fall into two main groups at widely separated in geological time: karst in the Palaeozoic limestones, mainly in the eastern part of the state, and that in Cainozoic limestones which are found from East Gippsland to the South Australian border. The next largest group is the volcanic caves of the Western District Volcanic Province which have a wide range of features, many of national and international geological significance. Significant features are found in a range of other rock types including granitic rocks, quartz sandstones and silcrete.

Celebrating Planet Earth: UNESCO Assisted GEOPARKS in the Australasian-Pacific Region

Joanne McKnight[1], Susan Turner[2] & Dr Susan White[3]

[1]Chair, Volcanoes Discovery Trail Committee [2]Convenor, Australasia-Pacific Geoparks Network
[3]Convenor Standing Committee on Geological Heritage, Geological Society of Australia

The recent initiative by UNESCO to establish a worldwide Network of Global Geoparks has important implications for Australia, especially western Victoria and southeastern SA. The Geological Society of Australia and various state government departments have been documenting geological sites of conservation and heritage value for over 30 years. The Geopark Network aims to promote geological sites for geotourism, education and research. The Geopark model most likely to be effective in Australia is a 'grass-roots' approach where local communities in conjunction with different levels of government take responsibility for their own region. Comparison with some of the European Geoparks Network provides useful examples. An informal network of people interested in forming Geoparks in Australia and the South Pacific has been formed. A formal application for a Global Geopark is currently underway for the region known as the Kanawinka Geopark, extending across the South Australian and Victorian borders. This Geopark is concerned predominantly with the volcanic landscapes of the Western District Volcanic Province and its geological context. This presentation will outline aspects of the proposed Kanawinka Geopark. The area proposed, extends from Colac and Red Rock to the coast of South Australia past Millicent and north to Nigretta and Wannon Falls and the base of the Grampians. This area has significant volcanic caves and associated karst areas and is of interest to both CEGSA and VSA. Since 1998 the local government bodies of this region commenced operation of the Volcanoes Discovery Trail Committee to promote the region and link geology with tourism. Important aspects of Geoparks are the links between the geology and the people, their stories, culture and history that build into a sustainable source of geotourism, bring jobs to rural and indigenous people and in turn help protect sites of importance and promote geoheritage complementing the work of the interested non government and government organisations.

From bones to beetles: Tasmanian caves as biological repositories

Arthur Clarke & Nic Haygarth

Prior to their attraction as tourist visitor destinations, caves were heralded as sites for biological study. Although the allure of glow-worms in Tasmanian caves has captured the imagination of many observers and scientists alike, most of the early biological interest in caves centred on the study of bone deposits. In the early 1840s, during the infancy of organised structures for natural science in Tasmania, naturalists and scientists were encouraged to look at the bottom of caves for bones. An initial fervour of activity occurred in the mid-1840s, with the discovery of bone deposits in caves on the eastern bank of the Tamar River, in northern Tasmania. Some twenty years later – with the encouragement of Professor Owen – Messrs Whintle, Allport, Krefft and other members of the Hobart-based Royal Society of Tasmania unearthed extant and extinct mammalian species from "ossiferous deposits" in caves west of the Derwent River, just north of Hobart. In the early 1880s, the searches for mammalian skeletal remains in caves at Mole Creek lead to the discovery and description of the first Tasmanian cave invertebrate: the Tasmanian Cave Spider. Although interest in the bone deposits of Tasmanian caves continued well into the 1900s, the focus of cave biology studies had broadened to encompass the range of invertebrates, including extinct species collected as bedrock fossils in caves and/ or the surrounding limestone. From around the turn of the 20th Century, the study of living species in Tasmanian caves included the first collections of cave crickets, harvestmen and other cave dwelling spiders, together with an on-going interest in the taxonomy of the Tasmanian Cave Spider and cave dwelling glow-worms. In 1910, a cave at Ida Bay in southern Tasmania yielded several new species, giving rise to description of the first cave adapted beetle from Australia.

From 44 gallon drums and cavers to concrete, 'caissons' and engineers – creating an entrance shaft into Ruakuri Cave, Waitomo, New Zealand

John Ash

Setting: Ruakuri Cave is situated at Waitomo Caves, New Zealand. It is a 5 km plus network of large vadose river canyons and smaller phreatic passages cut through a fault-bounded block of Oligocene Otorohanga Limestone. The system has three main levels of passages, two dry entrances, three walk-climb in stream entrances, two abseil shafts, one siphon, one excavated entrance, two possible digs and three reasonable question marks.

History: In 1904 tours accessed the cave via a sloping rock debris pile leading down into a wide passageway at the base of a 60m high cliff face. Over the last 4-500 years New Zealand native Maori had used this entrance, and higher openings in the cliff face, as a *waahi tapu* or burial site. In 1906, after paying compensation to the tour pioneer, James Holden, the government took over the operation. On Waitangi Day, February 7, 1988, the cave was closed to dry tours as a result of a land dispute between descendants of James Holden and the government operator at the time, the Tourist Hotel Corporation (at that stage THC also operated the Glowworm Cave and Aranui Cave). Subsequent cultural issues ensured that the *waahi tapu* entrance would not re-open. The dry tours ceased to operate. For the next 17 and a half years the Holden family investigated alternative means of accessing the cave. These included: 1989-1992: Consulting with the Department of Conservation and Maori elders (*kaumatua*) for a culturally acceptable means of re-opening the traditional entrance. This negotiation was finally abandoned. 1993-4: Tunneling into the upstream section of the cave and creating a boat ride to link up with cantilevered walkways that would connect with the old tour route. This initiative stimulated competing activity from a neighbouring landowner. Eventually it resulted in the Holden's purchase of 5 acres of adjoining land, thereby ensuring the protection of this section of the cave. 1994: Enlarging the stream entrance used by Black Water Rafting adventure tours. A few quick cash-flow calculations ensured that the wetsuit-clad, cave rafters were left in peace. 1995-2000: Engaging a developer to obtain relevant Resource Consents and to investigate excavating and enlarging the Rimrock extension – a passage that was extended, explored and mapped, with the assistance Black Water Rafting guides, in 1996-7. The extremity of this passage was connected to the surface by drilling from a ground survey point. Further investigations involved a baseline report on the cave climate, trials with a 40,000 psi rock-cutting water blaster and consulting with underground pipe-thrusting experts and theme park ride designers. In the final analysis the term "open cheque book engineering" was coined. The developer went into voluntary receivership. 2000-2003: Forming a new partnership with APR, one of the consulting companies involved in obtaining the Resource Consents, and The Legendary Black Water Rafting Co. (BWR). This partnership acquired the assets of the former developer, which included the consents and ten 2.4m by 2m concrete sewer pipes. Focus now shifted from the Rimrock passage to the Drum entrance, which had been excavated by recreational cavers and lined with 44 gallon drums in 1968. It was situated about 80m north of the previous site, just within the Ruakuri Bush Scenic Reserve administered by the Department of Conservation (DOC).

Engineering: Because this section of cave lay under crown land administered by DOC, a concession needed to be applied for and a new set of conditions added to those in the original Resource Consent. The developers now had to monitor: the cave climate for: • air flow • temperature • humidity • carbon dioxide and • volatile organic compounds • vibration and speleothem damage • stream sediment loads • air and water pollution • cave sediment excavations • cave biota and • energy inputs. Limits of acceptable change were established and standards were set for all earth and engineering works. Engineering designs evolved - from simply enlarging and shotcreting the existing Drum entrance, to sheet-piling a cylinder directly at the entrance, to sinking a caisson offset from the entrance and tunneling into the cave. The approach depended on how much geotechnical information one was prepared to collect, engineering expertise and creativity, tenacity and the size of one's cheque book. In 2003, Tourism Holdings Ltd (THL), who operate the Glowworm Cave and Aranui Cave, made an offer to purchase the Ruakuri development as well as the Legendary Black Water Rafting Co. At the time THL were New Zealand's largest tourism operator; they had the capital backing and the move

made strategic sense. Back to a three cave operation. Extra geotechnical drilling was carried out and the nature of the fault line on which the Drum entrance was situated was evaluated. It was then decided to proceed with an excavation off-set from the present cave access and connect this to the entrance chamber by a tunnel. Contracts were let to construct a top-down caisson that would be shotcreted to a wall thickness of 300mm. Geotechnical cloth and plastic drainage grid would be installed around the perimeter of the structure to maintain the hydrological integrity of the host ground. Detailed surveying was carried out to calculate the final baseline of the excavation and the orientation of the inter-connecting tunnel. This information was critical if speleothem damage within the first chamber was to be avoided or minimised. The inter-connecting tunnel was to be formed by pipethrusting the ten surplus 2.4m diameter sewer pipes from the floor of the caisson directly into the cave. It would pass beneath the original 44 gallon drum entrance. Consent parameters were continually monitored and temporary 'airlock' doors were installed in the pipe tunnel prior to breakthrough into the cave. Once access to the cave proper had been achieved, in-fill sediments in the Drum passage were hand excavated and removed by wheelbarrow, skip and crane. Sediment floors and banks were channel sampled for later analysis. Buried, broken speleothems were also marked and collected for later study. Steel formwork was then attached to the walls of the entrance cylinder in preparation for the pouring of a 150 metre, 1 in 10, spiral concrete access ramp. Power supply cables were readied for feeding into the cave before the entire structure was roofed over. 'Airlock' doors were installed in the entrance and exit openings to the caisson as well as in both ends of the inter-connecting tunnel and a water 'shower' established – dripping from the roof onto a large piece of karren in the centre of the floor. The latter feature gave some degree of control over the humidity and temperature of the air in the entrance cylinder. The finishing touches involved theming the outside of the structure that protruded above ground level with gunite, to make it look like, and blend in with, surrounding karst outcrops - and burying, landscaping and planting the roof. Finally, on July 28, 2005, after addressing all of the stakeholders' needs and having staff swim 200 metres to work for eighteen months, dig out 300 tonnes of silt by hand, mix 1000 cubic metres of concrete and lose 10 kilograms in weight each, a 17 and a half year project reached a successful conclusion. Ruakuri Cave re-entered the tourist arena as an innovative 1.2 km long, dry, wheelchair accessible journey.

Ruakuri walkways – practical cave engineering

Van Watson

Recreational Cavers started an adventure caving business in a 'Tourist Cave'. Much later on they got to design and fit a new 'Tourist Cave Tour' into that cave. This is what happened.

Ruakuri cave – guiding the product

Van Watson & Angus Stubbs

What we knew then? How guides came into the BWR/ Ruakuri fold, where they got their passion for caves and how BWR moulded its guiding style. What we did. How we perceived the Ruakuri product could be guided, trials and training and how we started guiding the product. Modifying how physical constraints, Client expectations and Guiding X factors change how the trip runs. The future – How do we tap into a guide's passion for their profession and consistently deliver a quality, memorable product.

The story of SPAET Cave, British Colombia, Canada

Paul Griffiths & Carol Ramsey

SPAET Cave was a karst cave located on privately owned land near Victoria, the capital city of the Province of British Columbia. Beyond its natural attributes, the small cave had considerable historical, cultural, aesthetic, scientific and educational value. In particular, elders and other informed members of local First Nations had articulated the spiritual value and cultural meaning of the cave site. SPAET

Cave was ultimately destroyed by land development activities authorised by government entities, seriously harming British Columbia's evolving reputation for cave conservation and environmental stewardship. While primary forestry activities in British Columbia may no longer pose as great a threat to cave and karst resources as they once did, population growth and urban sprawl have placed SPAET Cave and other caves on privately owned lands in the Greater Victoria area at risk from land development activities. The SPAET Cave site came into conflict with a $5 billion development project described as the largest of its kind in British Columbia, with two major hotels, two golf courses and plans for 5,500 homes.

This paper examines the application of existing legislation, regulations, policies and practice guidelines in the case of SPAET Cave. There are currently no provisions in provincial legislation to require protection or special management for caves on privately owned lands in British Columbia, except by special circumstance. BC also has a comprehensive set of voluntary best practice guidelines for urban and rural land development. These guidelines recognise caves as environmentally valuable and sensitive resources. The story of SPAET Cave will illustrate why private land developers in British Columbia cannot always be relied upon to automatically or voluntarily protect and conserve valuable and sensitive caves or karst resources. While the story of SPAET Cave is not exactly a new one for British Columbia, it is hoped resolving the problems discussed in this paper will make it easier to avoid future cave losses

Škocjan Caves Park, Slovenia – Visions

Tomaž Zorman

Due to their exceptional significance, the Škocjan Caves were entered on UNESCO's list of natural and cultural world heritage sites in 1986. In 1999, the Caves were entered on the Ramsar Directory of Wetlands of International Importance as the first European Ramsar site in accordance with the guidelines for the designation of underground wetlands. In October 2004, the Škocjan Caves Park was included in the world network of biosphere reserves MAB – "Man and the Biosphere" as the "Karst Biosphere Reserve"; all of this was under the auspices of UNESCO. By 2004, there were only 19 locations in the world, including the Park, that participated in all three of the above mentioned programmes. The Park is also part of the European network, Natura 2000, which is aimed at the conservation of areas of internationally important animal and plant species and natural habitats. The protected area of the Park covers 413 hectares and encompasses three villages, Matavun, Škocjan and Betanja, with a total of 67 inhabitants. The area of influence of the Škocjan Caves Park covers about 45,000 hectares and includes the entire Reka River watershed. The Škocjan Caves Public Service Agency, established by a Decision of the Government of the Republic of Slovenia, began to operate in 1997. The highest body of the Park is the Agency's Council which comprises the representatives of various ministries, local community and the Slovenian National Commission for UNESCO. Since its establishment, the Park has been fostering exemplary co-operation with local inhabitants in the area of natural and cultural heritage protection, cultural heritage renovation and organisation of various activities. Biodiversity in the Park is an important and valuable feature. It represents unique evidence of the Earth's history and geological development in the area as well as enabling the preservation of data in the genetic code of all rare and endangered animal and plant species while shaping the history of the area and its inhabitants. This enables an original approach to environmental education. Special attention is paid to young people with far-reaching goals such as building awareness of nature and the problems of social activities in such areas as economy and politics, education for tolerance and respect, responsible action and use of knowledge. The Park's management carries out work programmes in accordance with the Programme for Protection and Development of the Škocjan Caves Park (a management plan) as well as professionally and responsibly managing our natural and cultural heritage.

Karst issues in an hydro-electric power proposal: Iralalaro-Paitchau karst, Timor-Leste

Susan White[1], Greg Middleton[2] & Nicholas White[3]

[1] Latrobe University Environmental Geoscience, & Victorian Speleological Association [2] Sydney Speleological Society, & Southern Tasmanian Caverneers. [3] Australian Speleological Federation Conservation Commission, & Victorian Speleological Association

The proposed Iralalaro hydro-electric scheme in far eastern Timor-Leste would divert water from the Irasiquero River upstream of the Mainina sinkhole to a tunnel through the Paitchau Mountains leading to a power station on the coast. The Iralalaro-Paitchau Mountains area is a karst region, containing a wide range of karst-related landforms and features. These include a large polje, collapse dolines, sinkholes, blind valleys, karren, caves and springs. A substantial component of the hydrology is underground and the area relies on underground water for almost all of its water supplies. The area has significant surface and underground geodiversity and biodiversity. The proposal, as currently formulated, appears to have a number of significant limitations which, unless adequately addressed, could cause significant cost overruns and/or seriously undermine the scheme's viability. Estimates of the construction costs appear to have underestimated the risks and costs of drilling, tunnelling and de-watering the karstic terrain, and as a result are inadequate. Understanding of the relationship between the lake and the watertable is inadequate, as are stream flow records, with consequent implications for sustainable power generation from the scheme. The karst has not been subjected to a thorough and detailed study by experts in this specialised field, and the implications of the karstic nature of the terrain appear to have been poorly understood. A full investigation of the hydrology, caves and karst features of the region is essential. The proposed hydro scheme is incompatible with the maintenance of many of the natural and cultural values which give the area its special significance and ecotourism potential. It jeopardises proposals to provide protection to the special environmental values of the area and could damage precisely the features most likely to attract adventure tourists, putting at risk the development of tourism in the region. The people living in the environs of the proposed scheme appear ambivalent about the possible benefits. A lowered regional watertable may affect the entire population and agricultural production east of Los Palos. The existing proposal inadequately addresses the problems of the very limited infrastructure in the area. There are serious questions as to the ability of the proposed scheme to provide the claimed electricity output on a continuing basis at the currently estimated costs and with the suggested low levels of environmental impact. Despite the serious inadequacies in the investigations and documentation there are indications that the Timor-Leste Government is likely to approve the scheme.