LIMESTONE QUARRYING VERSUS KARST[1] CONSERVATION AT IDA BAY

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INTRODUCTION

There is evidence to suggest that limestone caves at Ida Bay provided shelter for aboriginal people who occupied southern Tasmania during colder climatic conditions that prevailed in the late Pleistocene. In historical times, it was timber workers who discovered the spacious outflow entrance of Exit Cave in the 1890s. Mystery Creek Cave, an inflow cave 2 km away on the opposite side of Marble Hill, was also located around this time. Magnificent displays of glow worms (the luminous larvae of the fly *Arachnocampa tasmaniensis*) that are a feature of both these caves attracted early attention. In 1895 a note in *Scientific American* reported the impressions of an early visitor who enthused how "on the lights carried by the party being extinguished, the ceiling and sides of the caves seemed studded with diamonds".

Systematic exploration of caves at Ida Bay commenced in the 1940s - Exit Cave was followed upstream to an area of rockfall that temporarily halted progress nearly 1 km from the entrance. The subsequent discovery of a route through this obstacle led to many more kilometres of cave passages, massive underground chambers, and areas of spectacular calcite and gypsum formations. An additional entrance located high on Marble Hill was found to drop in a series of vertical shafts to join the main passages in Exit Cave some 220 m below the surface. This gave Exit Cave the title of Australia's deepest as well as longest cave system at that time. Despite more than four decades of intensive exploratory work by cavers, the potential for the discovery of additional caves and new passages in known caves at Ida Bay remains enormous.

Many other caves that are present on Marble Hill form part of a larger system associated with Exit Cave. It is possible for humans to negotiate the passages linking some of these caves to Exit Cave (Goede 1969; Kiernan 1991), while in other instances sections of submerged passage or rockfalls prevent connections that are known to exist from being made. For example, dye tracing has shown

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1 *Karst* refers to terrain which results from the enhanced solubility of certain rock types, notably limestone and dolomite, in natural waters. Caves are just one landform that characterises karst environments.

that streams in Mystery Creek Cave and Little Grunt flow to Exit Cave, but cavers have so far been unable to physically traverse the link between these caves. As a consequence of the integrated nature of the caves, impacts which may ostensibly be confined to a small area have the potential to be transferred to other parts of the wider karst system.

WORLD HERITAGE STATUS & SUBSEQUENT DEVELOPMENTS

In 1988 the Helsham Inquiry recognised Exit Cave as a site of "outstanding universal significance from the scientific point of view" (DASETT 1988). Evidence presented at the Inquiry stressed Exit Cave's value as a habitat for specialised invertebrate fauna. Many of these species occur only at Ida Bay, such as an unusual blind cave beetle (*Goedetrechus mendumae*) known only from Exit Cave (Richards and Ollier 1976). The importance of Exit Cave from a geomorphological perspective was also argued during the Inquiry. Its significance in this respect relates not only to its intrinsic value as a major karst system with a long evolutionary history, but also to evidence within the cave which is likely to contribute to research into wider questions of landscape evolution and past climates (Houshold and Davey 1987).

The Ida Bay karst was subsequently nominated for inclusion within an expanded Western Tasmanian World Heritage Area. Implicit in the successful nomination was the importance of the undisturbed state of the cave system and the need to protect its catchment area. The entire Ida Bay karst and its catchment was therefore nominated.

Concern over the issue of limestone quarrying by Benders Pty Ltd on the eastern side of Marble Hill and within several hundred metres of mapped passages in Exit Cave, arose at aro nd the time of the World Heritage debate. The quarry site was included within the World Heritage nomination, although a 77 ha area in the vicinity of the quarry was excluded from a new South West National Park that was proclaimed shortly afterwards. The quarry area was given the lesser protection afforded by Conservation Area status and limestone extraction continued. In 1990 a proposal to extend operations into an area of high purity limestone containing many caves to the immediate south of the existing quarry highlighted the uncertainties associated with the impact of quarrying on karst values at Ida Bay. The incentive for this expansion was provided in large measure by changes to the grade requirements of the major user of limestone from Ida Bay - Pasminco Metals-EZ. The proposal stimulated a series of studies to address the impacts of quarrying on natural values at the site.

Two outcomes of the studies are particularly relevant in relation to the conservation status of Exit Cave. Firstly, it was found that Bradley Chesterman Cave - a cave of modest extent not far from the quarry - had been heavily

impacted. Runoff from the quarry appeared to be responsible for thick clay deposits clogging the streamway in the cave, and organic and inorganic pollution probably derived from wastes disposed of within the quarry area, were found to be present (Houshold and Spate 1990). A biological survey revealed that in comparison to up to 8 invertebrate species found in streams in comparable caves nearby, the stream fauna in Bradley Chesterman Cave consisted almost entirely of planarians (Eberhard 1990). The changes which resulted in the local extinction of other acquatic fauna in the cave had apparently produced highly favourable conditions for the planarians. Here was a clear indication of the potentially deleterious effects of quarrying on caves and their biological contents.

A further important finding was the probability that drainage from the quarry area also found its way to Exit Cave. A dye tracing experiment showed that a stream sinking underground less than 300 m from the edge of the quarry contributed to the flow in a major tributary stream in Exit Cave. The proximity of this streamsink to the quarry, and reports of turbid water entering Exit Cave from the same tributary that had been dye traced, suggested that the impacts of existing quarry operations were not merely confined to Bradley Chesterman Cave.

Confirmation that the quarry area formed part of Exit Cave's catchment was provided by further water tracing in November 1991. These showed that water sinking underground into a hole on the middle quarry benches, and into a cave named Little Grunt at the top of the quarry, drained rapidly to Exit Cave (Kiernan 1991). This information encouraged cavers to look at an unexplored passage that had been noted on a previous trip to Little Grunt. The result was the discovery of several kilometres of large tunnels extending directly beneath the quarry floor in one direction, and back to within a short distance of the known extent of Exit Cave in the other. A feature of the passages in Little Grunt which received runoff from the quarry area was the presence of clay deposits resembling those mobilised in large quantities on the quarry face. As with Bradley Chesterman Cave, there was evidence of changes in the composition of acquatic fauna in Little Grunt.

Shortly after these discoveries were made, the Department of Environment and Planning released a Draft Environmental Management Plan for Benders Quarry. This document, which maintained that the quarry could be significantly expanded without major impacts on the karst system, was heavily criticised.

TOWARDS A RESOLUTION?

In August 1992 the Minister for the Environment, Mrs Ros Kelly, announced that the Federal Government would exercise its powers under the *World Heritage Properties and Conservation Act 1983* and ordered the cessation of limestone

quarrying at Ida Bay. However, a subsequent announcement that limestone extraction would continue in the guise of rehabilitatory measures has aroused concern about new impacts that such activities may cause, and the real strength of commitment to protecting the Ida Bay karst system.

The fight to protect Exit Cave has attracted considerable public interest and been widely publicised. In contrast, other cave and karst conservation issues in Tasmania have passed virtually unnoticed. In 1991, caves in the Nelson River valley joined those in no less than five other Tasmanian karst areas that have been wholly or partly submerged in hydro-electric impoundments. Ida Bay is only one of several sites where limestone quarrying has occurred to the detriment of nearby caves. Other caves are subject to less dramatic degradation in the form of impacts associated with use by recreational cavers. Thus, a failure to recognise the importance and uniqueness of Tasmania's karst estate would seem to be well entrenched in this state's recent history. This fact does not augur well for the conservation status of those karst areas which do not contain the longest or the deepest caves, or which lack the emotive connotations that go with World Heritage status, but which may be important for a myriad of other reasons.

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