

**Submission
No 50**

INQUIRY INTO WATER AUGMENTATION

Organisation: The National Trust of Australia (NSW)
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The Director
Standing Committee 5: Upper House Inquiry into Water Augmentation
Parliament House
Macquarie Street
Sydney NSW 2000

Dear Director,

Legislative Council Inquiry into Water Augmentation

The National Trust of Australia (NSW) makes the following submission to the Legislative Council Inquiry into Water Augmentation in respect of a proposal to dam the Belubula River at Cranky Rock and Needles Gap which would lead to the flooding of the Cliefden Caves, a geological feature of national and international significance.

In July 2014 the Cliefden Caves Landscape Conservation Area was listed on the National Trust Register and in October 2014 the National Trust nominated Cliefden Caves for listing on the State Heritage Register. In its nomination the National Trust argued that this place met all seven criteria for listing on the State Heritage Register.

The Trust is currently preparing a nomination for the listing of Cliefden Caves, the Cliefden Caves Limestone Group and the Malongulli Formation on the National Heritage List.

The State Heritage Register nomination for Cliefden Caves set out its heritage significance: -

- A. Cliefden Caves is important in the course or pattern of the cultural or natural history of New South Wales because it is the site of the first discovery of limestone in mainland Australia and the first fossiliferous Ordovician limestone recognised in New South Wales. The caves are important in the course of the natural history of NSW as mud deposits in the caves contain unusual minerals and are an important record of past environments. Tufa Dams on Davys Creek provide evidence of past climate change events.

Cliefden Caves area is also highly significant in the geological evolution of New South Wales, with limestones 363 metres thick deposited there during a hiatus lasting approximately 5 million years when intense volcanic and intrusive activity characterised the Macquarie Volcanic Province of the Lachlan Orogen (Lachlan Fold Belt) temporarily ceased.

- B. Cliefden Caves has a strong or special association with the life or works of a person, or group of persons of importance in the cultural or natural history of New South Wales because the Caves provide evidence of a significant human occupation more than 6,000 years before the present day through examination of skeletal remains which provide an indication of how the local people lived at this time.
- C. Cliefden Caves is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in New South Wales because of its aesthetic distinction and landmark qualities. The caves are one of the most cavernous limestone areas in New South Wales decorated with the full range of speleotherms including rare blue stalactites, stalagmites, columns, Helictites (the "Helictite Wall" of Main Cliefden Cave) and "bacon" draperies.



- D. Cliefden Caves has strong or special association with a particular community or cultural group in New South Wales for social, cultural or spiritual reasons because of their strong and special association with the speleological groups who visit, document and map the caves and the scientific community who investigate the fossil beds and the caves and thermal spring.

Fossil Hill and Trilobite Hill have long been recognized as iconic examples of Australia's palaeontological heritage. At least 62 scientific papers have been published in a variety of international journals and it has been the focus of several field visits associated with major international palaeontological conferences in recent years.

Many palaeontologists from overseas have visited the area, either on these conference excursions or as part of international scientific collaborative projects to study the rich fossil heritage of this biodiversity hotspot in Late Ordovician time, when the area was an island located in the northern tropical zone.

- E. Cliefden Caves has potential to yield information that will contribute to an understanding of the cultural or natural history of New South Wales. The mud deposits in the caves contain unusual minerals and are an important record of past environments. The Cliefden Caves - Belubula River Valley sites contain the best exposures of Late Ordovician island marine invertebrate fossil assemblages in Australia. Geologists around the world regard it as a superb example of an Ordovician island faunal assemblage.
- F. Cliefden Caves possesses uncommon, rare or endangered aspects of the cultural or natural history of New South Wales. The blue speleothems vary from very pale blue flowstone in Taplow Maze Cave to the azure blue stalactites in Boonderoo and Murder Cave and are rare and world renowned. The blues and greens of the earth's surface are exceptionally rare in underground Australia being reported from Cliefden Caves in New South Wales and Mole Creek Caves in Tasmania. Also rare is the presence of the thermal spring on the Belubula River near the caves. It is one of only three thermal springs associated with Karst in NSW.

Ordovician period rocks in the vicinity of Cliefden Caves contain some of the most scientifically valuable (in some cases unique) fossils in Australia, with several examples of global significance. Specimens documented in the geological literature include the world's oldest known in situ brachiopod shell beds (from Fossil Hill), the earliest rugose corals found anywhere on Earth (also from Fossil Hill), and one of the most diverse deepwater sponge faunas ever recorded (near Trilobite Hill), living on an oceanic slope environment that is very rarely preserved in the geological record.

Many fossil genera and species were first described from Fossil Hill, the adjacent Dunhill Bluff, or Trilobite Hill. Several of these fossil species, such as the trimerellide brachiopod *Belubula spectacula* occur nowhere else in the world (the genus is only recognized in two places – Cliefden Caves and Zhuhuia in south China – which in itself provides critical evidence of plate tectonic movement when these areas in the Ordovician Period were situated considerably more closely than today. In terms of modern biological conservation, the known population of *Belubula spectacula* (about 20 individuals at most) can be argued to be equivalent in scientific importance to the discovery of the Wollemi Pine.

62 scientific papers have been published in a variety of international journals, documenting 191 genera and 263 species of fossils from Fossil Hill, Trilobite Hill and other sites in the vicinity of Cliefden Caves; of these, 45 genera and 101 species are unique to the area.



- G. Cliefden Caves are important in demonstrating the principal characteristics of a class of cultural or natural places / environments in New South Wales because the site is one of the best documented Late Ordovician successions in Australia.

Geologists around the world regard it as a superb example of an Ordovician island faunal assemblage. It is the type locality for thirty two new species of fossil corals, stromatoporoids, trilobites, brachiopods, bryozoa, echinoderms and graptolites, and is an outstanding research and educational area with abundant well preserved fossils, particularly at Fossil Hill and Trilobite Hill.

It contains abundant examples of some of the earliest shell beds in the geological record and the earliest known rugose corals (Webby, 1971) (an extinct order of coral that were abundant in Middle Ordovician to Late Permian seas) (Webby & Percival, 1983). More than 180 fossil species have been recorded from the Cliefden Caves Limestone Group and the overlying Malongulli Formation. The Cliefden Caves - Belubula River Valley sites contain the best exposures of Late Ordovician island marine invertebrate fossil assemblages in Australia.

It is one of the major Ordovician fossil sites in New South Wales. The area is one of the best documented Late Ordovician successions in Australia. Geologists around the world regard it as a superb example of an Ordovician island faunal assemblage.

The National Trust understands that if the Cranky Rock dam proposals are built, the water level at Needles Gap will rise by up to fifty metres. Any dam that floods above approximately 380 metres ASL will flood Cliefden Caves. Both the proposed Cranky Rock dams would well exceed this height.

There are more than 100 caves and geological features at Cliefden recorded to date and they are in pristine condition as access to the site has been controlled. Some of the caves are up to 3 kilometres long.

Of the fossil species recorded at this site, 45 genera and 101 species are unique to the area threatened by flooding. The fossil deposits at Cliefden are used as an international paleontological reference site.

The Belubula River already has dams at a number of locations upstream of Cranky Rock including at Carcoar Dam, Lake Rowlands and at the Cadia Valley Mine operations. During the millennium drought the Belubula River ran dry, with the entire Lachlan system running out of water.

Native fish and Platypus also inhabit the river in the proposed area of inundation, and tributaries to the Belubula are known to have a high diversity of macroinvertebrate species compared to that of other watercourses.

The Belubula River is a tributary to the Lachlan River system. The wetlands at the end of the Lachlan River are protected by commitments from the Australian Government under international migratory bird agreements.

In the Trust's view the dam proposal is counter-intuitive to what is needed for long term water supply guarantees in Central Western New South Wales. The proposal has no regard to the impacts of climate change or new technologies which would provide better and more sustainable options.

The National Trust was concerned to hear reports that the dam proposals may be related to new mine developments and not local agriculture or town water supply and that the Australian Government is proposing private enterprise funding for the dam on the Belubula River.

The Trust strongly urges that the Cliefden Caves be fully protected for their state, national and international values and that the Inquiry consider a finding that the construction of dams at Cranky Rock and Needles Gap be rejected.



Such a finding would be in keeping with the Inquiry Terms of Reference 1b) and 1f) –

“examine the suitability of existing New South Wales water storages and any future schemes for augmentation of water supply for New South Wales, including the potential for aquifer recharge,”

and

“examine social, economic and environmental aspects of water management practices in New South Wales and international jurisdictions.”

The fossils deposits at Cliefden are of international significance, with the fossils being used as an international reference site for paleontological research. Flooding the area would permanently alter and destroy the fragile fossil deposits and prohibit future research on them. The impact of flooding the caves would also have similar consequences, with siltation and destruction of the sediment sequences and formations found within them, which are largely understudied.

The cultural heritage values of the area are of great importance to the State’s historical record. These include Cliefden being the first discovered limestone deposit in mainland Australia, early ninetieth century ruins built by the first land holders in Central Western NSW, and Indigenous sites in the area.

An additional dam on the Belubula River will reduce downstream flows, negatively effecting the ecology of both the Belubula River, and wetlands of the Lachlan River system. With the Lachlan River system already being over allocated, it will cause further degradation of migratory bird habitats in the Lachlan’s wetlands including the Booligal Wetlands and Great Cumbung Swamp.

Social and economic impacts of an additional dam will stem from the reduction of water for downstream water users. Combined with this, if private enterprise is the beneficiary of the water (as put forward in the Federal Government’s Water Infrastructure Ministerial Working Group paper in 2014), it would likely increase water prices for local water uses.

Yours sincerely,

Graham Quint
Director - Advocacy