Commonwealth of Australia

Inclusion of ecological communities in the list of threatened ecological communities under section 181 of the *Environment Protection and Biodiversity Conservation Act 1999*

I, PETER ROBERT GARRETT, Minister for the Environment, Heritage and the Arts, pursuant to paragraph 184(1)(a) of the *Environment Protection and Biodiversity Conservation Act 1999*, hereby amend the list referred to in section 181 of that Act by:

including in the list in the **critically endangered** category

- Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)

as described in the Schedule to this instrument.

Dated this….Eighteenth.....day of…...December 2009.....

Peter Robert Garrett

Minister for the Environment, Heritage and the Arts

SCHEDULE

Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)

Microbialites are discrete organosedimentary structures formed by the activities of specific microbial communities that occur at the bottom (benthic stratum) of certain aqueous ecosystems. Here, cyanobacteria and eukaryotic microalgae photosynthesise and precipitate calcium carbonate (limestone) from the surrounding water, leading to the formation of rock-like structures. Although microbialites have the appearance of rocks, they are in fact living ecosystems similar to coral reefs. Unlike corals, however, the hard carbonate structures of microbialites are not skeletal, but are instead the result of mineralisation in the biochemical environment. Microbialite construction is a passive process, unlike coral skeletal formation, which is an active and controlled precipitation of calcium carbonate by the coral tissues.

Thrombolites are a particular type of microbialite. They are distinguished from other microbialites, such as stromatolites, by the internal structure of their calcareous deposits. Stromatolites are finely layered, whereas thrombolites are not layered, and possess a clotted internal structure with fenestrae. Thrombolites are formed by the interactions of a complex association of photosynthetic prokaryotes, eukaryotic microalgae and true bacteria. They require access to a carbonate-rich water supply and sunlight for their growth and survival. The photosynthetic action of the microbes causes the precipitation of calcium carbonate as aragonite from fresh groundwater seeping up from underground aquifers.

The dominant type of microbe present in the Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton) are generally photosynthetic cyanobacteria. Historically, the dominant microbe for thrombolite formation is the cyanobacterium *Scytonema* sp., which grows in fresh to brackish waters with low nutrient levels. Other cyanobacteria found in the Lake Clifton thrombolites include the genera *Oscillatoria, Dichothrix, Chlorococcus, Gloeocapsa, Johannesbaptistia, Spirulina* and *Gomphosphaeria*, as well as numerous species of diatoms.

The Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton) is restricted to Lake Clifton, on the Swan Coastal Plain of Western Australia, south of Perth. Lake Clifton is situated within the Yalgorup National Park, and is the northernmost lake in the Peel-Yalgorup Lakes System. The Lake Clifton thrombolite community occurs on a relict foredune plain of Holocene age sands. The main known occurrence of the ecological community is a reef-like formation approximately 15 kilometres long and up to 15 metres wide along the north-eastern shoreline of Lake Clifton. Other smaller clusters of thrombolites are known to occur at the northern end of the Lake Clifton. The thrombolites cover a total area of approximately four square kilometres.