

Caves under your House

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The difficulty in managing caves within the metropolitan area is that people generally only know about what they see. To most, the natural environment encompasses trees and other plants, birds and the occasional lizard. In Yanchep National Park, there are also kangaroos, koalas and a beautiful golf course, with the caves, Crystal and Cabaret (as mentioned on the map), isolated natural features. This is actually quite comforting for most because the thought of snakes in the backyard, birds of prey in the neighbour's tree or caves underfoot is a thought that many would not be too keen on.

Caves in the backyard would make many people worry if the reality of the situation became known. The northern creeping arm of the Perth metropolitan area now extends into karst areas within Quinns, Emerald Valley and Sea Trees, all areas that also contain karst features. When we look at a map of Western Australia, it is evident that as a band of limestone extends into the southwest along the coast, so it is here that Western Australia's population will extend because people have a great desire to live by the ocean. With people now building in karst areas, a cycle of events has turned full circle in that the original human inhabitants (the Nyungar aboriginal tribes) were quite wary of dark places containing caves in the Yanchep area.

When looking into the pulling of resources from caves in Yanchep and Wanneroo, we find that the process actually began several decades ago with the mining of guano and limestone. More recently, the abstraction of water for timber, vegetables, drinking water and gardens has also had an impact which, coupled with lower than average rainfall, has led to a decline in the waters within the Yanchep caves.

These single events, added together over time, are having such an impact upon the karst systems of the Perth metropolitan area, that animal species as well as caves have the potential to be lost to future generations.

In looking at building in karst areas, corporate developers put together concept plans containing a summarised brief on the karst systems within an area, which are initially produced by local speleologists. Presented for comment to the EPA (Environmental Protection Agency), CALM (the Department of Conservation and Land Management), the Water and Rivers Commission, Local Government and the public, Local Government generally approves the plans with additional guidelines outlining areas of interest and the project proceeds. Where the development borders CALM land, and where there is a possibility of biodiversity being compromised, CALM can have more of a bearing on proceedings. CALM has the option of adding further constraints, and/or will consider land acquisitions as an extreme measure. Lot 51 (Wanneroo/Perth) is one such development that is currently under such consideration. The block of land is relatively small and the potential impact on surrounding karst and remnant vegetation is high. A very good submission was made for rural development, which has scope for sectioning off a reserve, but further investigation is necessary before the full impact can be assessed.

Without such a described threat, the resulting effect on a karst system may be very different. From the complete destruction of a cave through filling with concrete or collapsing with heavy machinery to substantial and partial deterioration with rubbish dumping and the taking of souvenirs, to good caving practices by segregating and fencing, the destiny of a karst system in a developing area is great and varied. When it comes down to the individual making his or her claim on a block containing caves, I have found that many of those lucky enough to obtain such a feature have taken a strong stand in saving their cave for future generations. Fears of collapse and instability sometimes play a part in sectioning off the karst area, but many are finding that through a little investigation and research by entering the caves of the Yanchep National Park, these fears are diluted. Upon seeing formations that have been growing for periods ten times longer than the pyramids have stood, or a thousand times longer than the longest standing building in their area, people realise that cave are not the unstable, dangerous places they once thought they were.

Karst Studies Presentations

Putting these educational messages to the public is the result of a great deal of research by past rangers and students. With Dr Edyta Jasinska, Dr Brenton Knott, Dr Andrew Storey, Mr Rob Foulds, Mr Lex Bastian and Mr John Wheeler to name a select few of those continuing to research the geological, hydrological and biological elements of the Yanchep karst systems, discoveries including historical changes and new species identifications are being achieved. These people on the ground believe there is more life yet to be discovered in the caves of Yanchep and that the importance of keeping the ecosystems alive for further study is of the utmost importance. One such important factor recently discovered is that root mats from the tuart trees above (*Eucalyptus gomphocephala*) are being produced in the shallow caves to support a mycorrhizal fungus, which acts as a food source and habitat for entire communities of aquatic invertebrates.

With a loss of groundwater in this area now having these animals under threat, a joint effort between CALM, the Water and Rivers Commission and the Water Corporation has been progressing to reinstitute water into several important cave systems. Trials have been continuing since late 1999, with a recovery team guiding emergency action within the isolated caves of Twilight, Carpark, Cabaret, Boomerang and Crystal and more robust trials within Crystal and the Ornamental Ponds.

The emergency actions have seen solar panels and enclosed 12-volt car batteries providing power to pumps in localised soak-wells. These pumps send water to lined areas containing root material within which survive these unique communities. Investigations throughout the world have indicated that the primary food source of the roots, the mycorrhizal association within and the groundwater streams flowing through the caves are vital to produce both the large numbers and great variety of species being seen. A need to develop groundwater resources for public use whilst maintaining species richness has led to the three government bodies becoming involved together and determining responsibility for collecting information and sharing resources to develop strategies for the long-term conservation of the caves.

Attempts have been undertaken to directly recharge Crystal Cave with appropriate waters as indicated through biological, physical and chemical parameters. Following on from this is the current project for re-flooding the Ornamental Ponds in the vicinity of Cabaret and Boomerang Gorge stream caves to aid in the recovery of streams in these root mat caves and others in the area. By placing water into an area downstream of the caves, a mound is developed and water banks up. In this manner, streams can be created throughout an entire area rather than in single caves.

There are several reasons being suggested for the lack of water in the Yanchep caves and none are as simple as the natural reduction in rainfall Western Australia is currently experiencing. Because higher rainfall relates directly to higher groundwater levels, it would be convenient to disregard the influences of pine trees, abstraction for market gardens and abstraction for Perth's drinking water supply. Although individuals may query the extent to which each factor is having an influence, the major governing bodies continue to work together to research historical levels, develop models and put in place infrastructure to resolve the issue of continuing degradation of caves, be they natural or not.