

### *Karst Abuse in Western Australia*

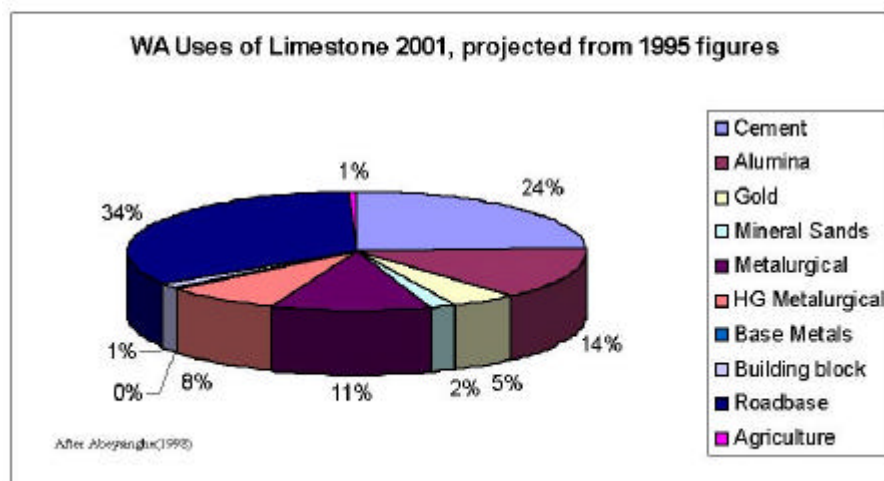
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#### LIMESTONE MINING IN WESTERN AUSTRALIA

A review of the limestone resources of Western Australia was conducted by P.B. Abeyasinghe, from the Department of Minerals and Petroleum Resources, in 1998 (Abeyasinghe, 1998). This review showed that by 1995 the state was consuming over 2.1 million tonnes of limestone per annum (See Figure 1).

Figure 1 also shows a graph of the uses of limestone for Western Australia. The major uses of limestone are our roads where limestone is used as roadbase to the tune of over 700,000 tonnes per annum (based on 1995 figures). The second biggest user of limestone is the cement industry at 500,000 tonnes per annum followed by the alumina industry consuming 300,000 tonnes per annum. These three uses are greater than 70% of our limestone consumption.

Year	Metro area	Loongana	Pilbara	Rest of State	Total
1992	1,967,651	112,281	69	3,845	2,083,846
1993	2,034,756	59,526	350	4,475	2,099,107
1994	2,154,060	62,021	420	6,410	2,222,911
1995	2,106,503	66,086	210	9,362	2,182,161



**Figure 1 – WA Uses of Limestone 2001 – projected from 1995 figures**

The majority, 96%, of this limestone is being mined in the Perth metropolitan area (See Figure 1). The next highest single area being mined is 3% being mined at Loongana on the Nullarbor. With the vast majority of the limestone currently being mined in the Perth region the impacts on caves is minimised as the Perth region has relatively few known caves in current mining areas. However the states "thirst" for limestone can only increase with population and mining companies with dwindling resources in the Perth region will look further a field for cheap limestone deposits.

Already that pressure is being applied to small limestone deposits just north of Perth in the Yanchep/Carrabooda and Moore River areas. If the Maud's landing development receives the green light then the development of a significant mine at Cape Range is very likely despite significant environmental and World Heritage Listing concerns.

Despite this the current situation is that mining of limestone in Western Australia is currently having a minimal impact on the cavernous karsts of Western Australia. However having said that the impacts of mining are low, the current usage of our precious limestone resources is at times frivolous.

## General Presentations

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The images shown in plates 1 through 6 show some of these uses. They range from blocks of limestone in train station car parks, to whole karst features being used as “ornaments” in road roundabouts, to children’s playthings in Kings Park, Perth, to the use of limestone as drainage rubble alongside roads.

This type of use of our precious limestone resource is unnecessary when alternatives are available.



***Plate 1 - Limestone blocks at Beckenham Railway Station***



***Plate 2 - Limestone blocks at Cannington Railway Station***



***Plate 3 - Limestone block on footpath at the Royal Show Perth?***



***Plate 4 - A graffitied Karst Feature used as a Roundabout “centre piece”?***



***Plate 5***



***Plate 6 - Limestone used as drainage rubble Brand Highway North of Perth***

### WHAT OF THE FUTURE?

The review of Western Australia's limestone resources by Abeysinghe (1998) also contains an important discussion (Chapter 3) which indicates that the projected demand for high-grade limestone is expected to be 95 million tonnes over the next 20 years. This equates to 4.75 million tonnes per annum and hence a significant increase in limestone production.

Abeysinghe (1998) also predicts that the demand for low grade limestone for roadbase, construction, building blocks and agricultural use will also continue to grow. In his concluding remarks Abeysinghe also predicts that if "the large limestone deposits located at Cape Range and in the Eucla Basin are developed, not only to serve local but also foreign markets, then a major expansion of the industry could occur."

Given the significant size of the Nullarbor limestone deposit and the relatively sparse distribution of caves and karst features it is considered that the development of a "Mega Mine" on the Nullarbor would be preferable to the continued development of all of the smaller deposits in the South West of Western Australia. Such a mine, if large enough, could certainly provide all of Western Australia's limestone requirements as well as supporting a healthy export market. Such a mine would require very careful siting with easy access to both road and sea transportation while ensuring that the potential impacts on the overall karst are minimised.

### DEVELOPMENT ON KARST

Another area of potential high impact on karst is human development. The sub-division of karst areas for housing development is one area that is having an effect on caves and karst features. As the Perth metropolitan area increases rapidly northward from Perth the karst areas at Carabooda, Yanchep and eventually Moore River are being developed for housing. Already one area at Carabooda, Emerald Valley & Alkimos Road, was found to contain a significant number of caves and karst features (23) but the development ignored the advice of speleologists and 8 of the caves or features were impacted by the loss of their entrance to roads or other infrastructure. (see [http://www.wasg.iinet.net.au/asf\\_02.html](http://www.wasg.iinet.net.au/asf_02.html))

This type of development is likely to continue and the conservation officers of the ASF must continue to lobby government departments to ensure that the impacts of development on karst is minimized.

Besides housing developments the placement of roads on karst also may have high impacts if cave entrances are covered or known caves have roads placed directly above them. In general the placement of new major roads requires an ERMP and companies preparing the ERMP generally contact speleological groups for information relating to caves in the vicinity of the proposed new road. Only roads on private developments have resulted in significant cave impacts in the last few years.

One of the major potential impacts on caves from development is the placement of infrastructure such as buildings, toilets, tracks/roads and car parks. Managers in karst areas must be made aware of the potential adverse impacts on caves by placing infrastructure adjacent to or worse still on top of known cave systems.

The developments at Calgardup and Giants cave in the South-West of Western Australia illustrate this point with buildings, water tanks, toilets and car parks placed too close to the cave systems they were trying to promote (See plates 7 and 8).

The placement of car parks for activities such as swimming and surfing adjacent to known caves is also to be avoided as this attracts the general public to visit caves when they may otherwise have not. Such a car park was placed within viewing distance of the entrance to Quinninup Lake Cave in the South-West of Western Australia. This can only result in unwanted uncontrolled extra visitation. Such decisions require cave managers to carefully consider the impacts of development on caves in karst areas and avoid such placements where at all possible.



***Plate 7 - Building, water tank and toilet placed over known cave system***



***Plate 8 - Car park cleared adjacent to known cave system***

### CAVER IMPACTS

Cavers cause considerable impacts on caves just by visiting them. This level of impact can be minimized using now well documented techniques (<http://www.caves.org.au/standards/minimal.htm>). Despite cavers visiting a large number of caves the damage they cause is generally confined to features within caves. The impact of vandals on caves in Western Australia has been relatively small in the last 20 years. Generally, damage that has occurred with caves has been the result of uneducated visitors breaching gates on caves and then walking on sensitive features within the cave.

However, in some areas, such as the Nullarbor, the effects of driving the 4WD directly to cave entrances can have very long-term detrimental impacts. Once a single set of tyre marks (a track) is created to a cave entrance they can remain in place for years. They tend to encourage other vehicles to follow the “track” leading them directly to caves. As the Western Australian Nullarbor has no on-site management the visitation of caves by the general public is relatively common. By avoiding driving the last 2 to 3 hundred metres to a cave entrance the cave maintains its “wilderness” status and provides it with added protection from casual visitation.

### CONCLUSION

In summary the greatest abuse of karst in Western Australia is inflicted by those “mining” limestone for a variety of uses. A second level of impact comes from managers of cave and karst while caver impact can generally be avoided if minimal impact techniques are applied to all caving trips.

Hence conservation efforts should be focused on minimizing the impacts of mining by encouraging the establishment of a “Mega Mine” near the Nullarbor coast. Efforts should also continue to educate local councils and cave managers about the impacts of development on karst systems.

### REFERENCES

ABEYSINGHE, P.B. (1998), Limestone and limes and resources of Western Australia, GSWA *Mineral Resources Bulletin* 18. Department of Petroleum and Mineral Resources. Perth, Western Australia.