GEOLOGICAL MONUMENTS IN WESTERN AUSTRALIA

INTRODUCTION

Rock outcrops and other sites of special scientific interest have been recognised as important for reference, research and educational purposes by geologists virtually since the science of geology began. These sites are subject to changes which can either reduce the value of, or alternatively may enhance sites. The ultimate purpose of any initiative concerning recognised sites is to carefully assess and manage activities detrimental to sites, and to support and manage positive activities.

This discussion paper is intended to;

- present a proposal for the assessment of the value, vulnerability and land tenure of recognised sites in WA,
- identify suitable methods for protection of sites,
- identify those sites requiring a certain degree of protection and
- develop a management plan for the site protection.

Within the context of this paper, all geological monuments, sites and areas of significance are referred to simply as sites.

RECOGNITION OF SITES IN WESTERN AUSTRALIA

The protection of sites has been under consideration for many years.

In 1962 a National Parks report compiled under the auspices of the Academy of Science and published by the Royal Society of Western Australia contained recommendations for the protection of 24 geologically important sites.

In 1972 the Environmental Protection Authority established the Conservation Through Reserves Committee (CTRC). That committee in its report (1974) on Conservation Reserves in Western Australia recommended the establishment of another committee, to be chaired by the Director of the Geological Survey of Western Australia (GSWA) and with members representing learned societies, the WA Museum, tertiary institutions, and the mining industry. This committee was to:

- prepare an inventory of geological sites in WA which merit protection,
- allocate priorities for the preservation of the sites,
- review legislative provisions and recommend new legislation if necessary, and
- advise on management techniques and the appropriate authority to control geological reserves where these are not already contained within national parks and reserves and protected thereby.

A committee was established, chaired by the Director of the Geological Survey, and met eight times between 18/4/78 and 24/4/80. It produced lists of suggested sites and allocated priorities for their preservation. Also it recommended appropriate reservation in certain instances and provided advice to various authorities about proposed developments.

The Geological Society of Australia in 1974 established a Geological Monuments Subcommittee. This subcommittee presented the report "Important Geological Sites in the Perth and Southwestern Area of Western Australia" (Lemmon, 1979). In this report were:

- arguments for the protection of important geological sites,
- an analysis of the prevailing State statutes having implications for the protection of geological sites, and,
- nomination of 35 sites as being important enough to protect. In addition, 12 sites were mentioned for future consideration and 11 were classified as having insufficient value to warrant inclusion.

A second initiative of the Geological Monuments Subcommittee followed in 1986 with the publication of the volume "Important Geological Localities in Western Australia" (Carter, 1986).

Also in 1986 the Federal Geological Monuments Committee of the Geological Society submitted a report to the Australian Heritage Commission (Cochrane and Joyce, 1986). This report listed geological and geomorphological features of national (totalling 28 sites) and international (23) significance in WA.

ROLE OF AUSTRALIAN HERITAGE COMMISSION

The Australian Heritage Commission (AHC) is required under Federal legislation (Australian Heritage Commission Act, 1975) to compile a Register of the National Estate. This register is an inventory of places of scientific, historic or other significance. These places are placed on an interim list before final acceptance on the register. Listing requires Federal authorities to consider the value of the sites before commencing any development proposal under federal jurisdiction. State and private persons proposing developments are not legally restrained by this legislation. However, in reality, other powers resident with the Commonwealth Government may possibly be used in specific cases to require developers to comply with the intent of the listing. This is the case when a decision of a Federal Minister is required to consent to a matter pertinent to the development, such as the export of minerals or where foreign capital is needed for the project.

There is a perception amongst certain interest groups of our society that listing should be regarded as a statement of the need to totally preserve a site, and is used to oppose any development that has a bearing on a site. The Register of National Estate lists features based on a broad range of categories, including sites of geological relevance. However, it does not group them in the same general manner in which geologists list geological monuments, and thus a moderately important geological site could be listed in the same group as an extremely important floristic site. This generalisation in the National Estate lists leads to development of the perception that all sites listed warrant total preservation by some people.

The Australian Heritage Commission has supported the documentation of geological sites in WA through the provision of grants. These grants were used to employ consultants who visited the sites, assessed their validity and value and compiled the two significant WA-based reports (Lemmon and others, 1979 and Carter, 1986).

During 1991 the AHC provided funding for the preparation of formal nomination documents. As a consequence, consultant Mr R. Halligan compiled 57 reports recommending sites in WA to be listed on the Register of the National Estate listing (see Appendix).

STATUS OF MONUMENTS IN WA

Geological monuments formally considered and adopted by the Geological Monuments Subcommittee of the Geological Society of Australia are listed in Lemmon and others (1979) and Carter (1986).

In general, monuments are classified in degrees of significance. The significance of those listed in the above reports are as follows:

International	28%
National	17%
State	43%
Local	12%

No consistent definition of the vulnerability of sites has been documented. A preliminary assessment by M J Freeman (GSWA) based on descriptions in the two volumes above suggests the following figures:

Extremely vulnerable	3%
Highly vulnerable	11%
Moderately vulnerable	13%
Slightly vulnerable	73%

The land tenure and Mining Act tenement status was listed at the time of compiling the above reports. A summary of the land tenure at those times is as follows:

Reserves under State or Local Government Vesting	42%
Land under Federal Government control	1%
Pastoral lease	32%
Private land	19%
Vacant Crown land	6%

Although Mining Act tenements were listed, the relatively short lifetime of each exploration or prospecting licence means the data listed is now invalid. Therefore no summary of the various tenement types has been conducted. Of greater importance than the presence of tenements is the proximity of the site to an existing mine or to a mineable or potentially mineable resource.

An additional factor of relevance is proximity to other predictable developments, such as areas likely to be needed for urban or industrial growth near cities. These, with the exception of a few sites within the close environs of Perth, have not previously been considered.

MONUMENT DOCUMENTATION

The prime purpose of documentation of geological monuments is to;

- have information readily available to facilitate rapid and proper decisions being made when development proposals impinge on monuments, and

- identify key features which require some form of protection from indiscriminate collecting or other damage and then initiate some process which can provide the appropriate level of protection.

The first purpose is well addressed by the existing volumes, although it is likely additional sites could now be documented. No specific actions have been taken to reinforce the second purpose other than in the case of listing on the National Estate. With valuable and extremely or highly vulnerable monuments, there is a need for the State to consider ways and means of protecting sites. There is also a need to continually re-assess the status of sites as the science develops and more information on the occurrence of key features is acquired.

A particular activity which is potentially devastating to certain sites and which requires addressing is that of unauthorised or illegal collecting. Even unprincipled researchers have been found to irreparably damage sites of world significance. Managed collecting at appropriate sites should be an available option for reputable researchers. However, collection by people for commercial or "hobby" purposes may need to be controlled or prevented. Existing legislative controls on this have recently been shown to be weak or nonexistent. This matter requires addressing.

The particular attributes of individual sites require consideration to determine the importance of sites. The aim of protecting sites should be to achieve a balance between the preservation of a small, irreplaceable site and the destruction or replacement of a site to allow a proposed development to proceed if the latter case is judged in the final analysis to be the best option for society as a whole. Both the vulnerability and value of sites require definition. Large, robust sites will require no more than endorsement of the feature, with, perhaps, special consideration being given to a key outcrop, whereas preservation of a small site which could easily be damaged beyond use may require fencing, signposting and active management. The value is a function of the use a site will be to geologists, the uniqueness, the clarity for demonstrating a geological process, its use as a holostratotype or for collecting purposes as well as its use in educational purposes. Both the vulnerability and the value require ranking to help prioritise sites. However, no precise or quantifiable parameters can be used to arrive at a ranking, and individual geologists will be inclined to subjectively view the vulnerability and value depending partly on their specialisation and experience with their use and protection of sites. It is therefore preferable to arrive at a ranking of both the value and vulnerability of a site through wide consultation. Carter (1987) contains useful categorisation of the significance parameters of sites, identifying these as ranging from local to international, and of value, as being of educational, reference or research value. However, Lemmon refers to values in general terms which do not allow for ease of relative ranking. The Geological Survey in conjunction with the Geological Society of Australia, industry groups and academia (including the Museum) should assess the vulnerability and value of those sites not currently categorised to a similar standard as in Carter (1987), and, where reasonable, re-assess those sites already described.

PROPOSAL FOR PROTECTION OF SITES IN WA BY THE GSWA

Under Program 3 (Environmental Management) of the Geological Survey's five year Program, there will be an assessment of the range of important geological sites in Western Australia and means of achieving protection. This assessment and implementation process will include the following:

- Assess the vulnerability and value of sites, reassessing those already described where reasonable.
- Include additional sites as identified subsequent to the published reports.
- On private land, inform the owners of the value of the site and assess possible means of gaining support for protection.
- On Reserved Crown Land, communicate with the vested authority to ensure the site is given due recognition and develop or modify a management plan if necessary to reflect the degree of site vulnerability. On reserves that do not provide the required level of protection such as a Local Authority extractive industry reserve, a separate reserve may be needed.
- Consider reservation of sites on vacant Crown Land and Pastoral Leases. Such reserves would usually be C Class under the Land Act and vested in the Minister of Mines. The Geological Survey would then manage the sites directly. The reserves would be identified on the Mines Department public plans so that there would be no accidental destruction of important sites. Where there were mining tenements, relevant conditions would be attached to the title.
- Maintain an awareness of the status of the Geological Site System to ensure that new important sites that may be identified are included.

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

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REFERENCES

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COCHRANE, R.M., and JOYCE, E.B., 1986 Geological features of National and International significance in Australia: A report prepared for the Australian Heritage Commission. *Geological Society of Australia, Federal Committee for Geological Monuments, Melbourne, Victoria.*

CONSERVATION THROUGH RESERVES COMMITTEE, 1974 Conservation reserves in Western Australia. *Report of the Conservation Through Reserves Committee to the Environmental Protection Authority, Perth, WA*

LEMMON, T.C., GEE, R.D., NORMAN, W.R., and ELKINGTON, C.R., 1979 Important geological sites in the Perth and Southwestern Area of Western Australia: A report on their scientific significance and future protection. *Geological Society of Australia Incorporated, Western Australian Division, Perth, WA*

APPENDIX

LISTING OF GEOLOGICAL MONUMENTS RECOMMENDED FOR INCLUSION ON THE NATIONAL ESTATE, 1991-2

Launder Amphitheatre
Augusta Shell Bed
Billeranga Hills
Binaronca Rock
Bindoo Spring
Black Point
Black Range
Bringo Railway Cutting
Bugle Gap
Bunker Bay
Callytharra Spring
Camel Creek
Cape Range
Carawine Pool
Coal Seam Park
Coolkilya Pool
Dalgaranga Crater
Dingo Gap
Duck Creek Gorge
Elimberrie Bioherms
Fairbridge Bluff
Gantheaume Point
Garden Pool
Geikie Gorge
Geraldine Lead Mine
Gneudna Paddock
Goat Paddock
Jack Hills
Jarrahdale Railway Cutting
Kanowna Dam
Kanowna Lake
Knossos
Marble Bar and Chinamen Pools
Meckering Fault Scarp
Meentheena
Molecap Hill Quarry
Mount Herschell Quarry
Mount Hunt-Lake Douglas Dam Traverse
Mount Narryer
Murchison River Gorge
Noondeening Hill
North Pole Stromatolites
Pinnacles
Rottnest Island Raised Platforms and Notches
Salmon Point, Rottnest Island
Shell House Cliffs
Stone Wall
Strelley Pool
Top Camp Unconformity

Veevers Crater
Wandagee Hill
Wave Rock
West Kimberley Lamproites
Windjana Gorge
Windmill Hill Cutting
Wittenoom Gorges
Woongarra Gorge