

**COMPILATION AND  
ASSESSMENT OF PLACES OF  
GEOHERITAGE SIGNIFICANCE**

**SOUTH-EAST QUEENSLAND  
COMPREHENSIVE REGIONAL  
ASSESSMENT (PROJECT NE 5.1.1)**

**QUEENSLAND CRA/RFA STEERING  
COMMITTEE**



**GEOHERITAGE SITES  
WITHIN THE  
SOUTHEASTERN  
QUEENSLAND CRA**

**QUEENSLAND MUSEUM**

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**Disclaimer**

The views and opinions expressed in this report are those of the author and do not necessarily reflect the views of the Queensland and Commonwealth governments. The Queensland and Commonwealth governments do not accept responsibility for any advice or information in relation to this material.

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## SUMMARY

This report has been prepared for the joint Commonwealth/State Steering Committee which oversees the Comprehensive Regional Assessment (CRA) of forests in the South East Queensland CRA region.

The Comprehensive Regional Assessment provides the scientific basis on which the State and Commonwealth governments will sign a Regional Forest Agreement (RFA) for the forests of the South East Queensland CRA region. This agreement will determine the future of the region's forests, providing a balance between conservation and ecologically sustainable use of forest resources.

This report was undertaken to assess sites of geoheritage significance within the South East Queensland CRA. The work follows similar projects and assessments undertaken by Willmott et al. (1984) but differs in the codification of sites and the addition of key fossil sites not previously included.

Key recommendations of this report are:

- most fossil sites, including type localities should not be included on the National Estate list
- fossil and stratotype localities should remain available to *bona fide* researchers without any additional administrative load or permit system.
- very few sites in the south east Queensland CRA are of paramount significance.
- very many sites are of local and regional significance.
- geological heritage sites, in general require low levels of conservation management.
- soil sites require substantial further investigation.





# 1. INTRODUCTION AND METHODOLOGY

## 1.1 WHAT IS A GEOHERITAGE SITE?

This study was undertaken to identify potential or indicative National estate places with relevance to geoheritage significance within the Southeast Queensland Comprehensive Regional Assessment area under the Regional Forest Agreement.

This study sites of geoheritage significance identifies areas principally under the following categories

- A: Its importance to the course or pattern of Australian natural history.
- B: Its possession of uncommon, rare or endangered aspects of Australia's natural history.
- C: Its potential to yield information that will contribute to an understanding of Australia's natural history.
- D: Its importance in demonstrating the principal characteristics of a class of Australia's natural history, or a class of Australia's natural or cultural environments.
- E: Its importance in exhibiting particular aesthetic characters values by a community or cultural grouping.

The following National Estate criteria were not of relevance to this study, which did not examine any aspect of the social history, sociological or other cultural aspects of potential geoheritage sites.

## 1.2 AREA COVERED

The Southeast Queensland CRA extends from Gladstone in the north to the New South Wales border, west to the Bunya Mountains and also includes the insular Blackdown Tableland.

It differs in coverage from the area studied by Willmott et al. (1984) which included the Darling Downs.

## 1.3 METHODOLOGY

Data sets were compiled using currently published records of geological heritage sites, field guides, geological maps and use of Queensland Museum corporate datasets. Type fossil localities were identified using published catalogues of Lees (1986), Rozefelds (1986), Rozefelds, McKenzie & Mobbs (1990), Turner (1982), Parfrey (1996) and by use of QM datasets and consultation of papers compiled in the unpublished list of Cook (1997).

Geological information was compiled from field guides and 1:250 000 geological maps and explanatory notes.

Key sites were identified and located on 1:100 000 scale topographic maps. Updated national parks and forestry information were identified from recently published maps.

## **1.4 INITIAL THRESHOLDING PROCESS & COMMENTS**

As a preliminary guide to the assessment panel all sites were placed broad groupings to identify ranges of features and potential gaps in the landscape and geoheritage sites examined.

Initially fifty three sites were identified, but subsequent review revealed that an additional sites required assessment. All sites were reviewed by the panel to determine which categories of national estate value were associated with the site. These are tabulated below.

The assessment panel agreed that broad divisions of sites would be the most effective way of dealing with the range of landscapes and geological sites discussed. These divisions are:

- fossil sites
- sites of the Great Sandy region representing Aeolian coastal processes
- sites related to volcanism and igneous activity
- soil sites
- sites relating to weathering and erosional features
- other sites, ungrouped.

## **1.5 NOTES ON FOSSIL TYPE LOCALITIES AND STRATOTYPE LOCALITIES**

One of the requirements of fossil type localities and stratotype localities is that they are available to scrutiny through *bona fide* research. Fossil sites, as much as possible should be open to additional collection for research purposes when necessary. In addition, some fossil type localities, collected late last and early this century, no longer exist (due to development or quarrying) or do not have specific locality information. These localities have been omitted due to obvious reasons.

The intrinsic value of fossil sites rests from the material collected from them, and whilst sites in some cases demonstrate important field relationships, their value resides in material deposited in scientific institutions. Care should be taken when managing such sites to ensure that the scientific availability is maintained along with the in situ value of each site. Stratotypes indicate field relationships but should be available for research collection with respect to their lithology.

In this report we have not included stratotype localities which are known from drill core. This is for obvious reasons.

## 1.6 SITES ACCORDING TO ASSESSMENT CRITERIA

Assessment criteria identified are tabulated for each locality. This was done to facilitate assessment of sites by the expert panel.

**TABLE 1.1 PRIMARY CATEGORIES AND SUGGESTED INDICATIVE SENSITIVITY RATINGS FOR SEQ GEOHERITAGE SITES. NB. ALL SITES ARE RATED WITH 6,7,8,9 SENSITIVITY CODES IN ADDITION TO THOSE INDICATED. SITES IN PLAIN TEXT ARE THOSE EXAMINED AND DEEMED BY THE ASSESSMENT PANEL AS BELOW THRESHOLD LEVEL.**

Grouping	Site Name	Categories	Indicative sensitivity codes
Great Sandy Region Aeolian coastal sites	Giant Sand Dunes Moreton Island	A1 B1,A2, E1,C1,D1	2,5,10
	Bribie Island	A1 A2,C1,E1,D1	2,5,10
	Cooloola-Noosa R.	A1,B1,C1,A2,D1	10
	Amity Point fossil reef site	A1, C1, B1	10
	Fraser Island	A1 Most of A,B, C ,D,E criteria	2,5,10
	Deception Bay Beach ridges	A1 C1,D1,A2,B1	2,5,10
Sites relating to volcnism and igneous activity	Minto Craggs Ring Dyke	A2 A3,C1, E1	
	Mount Marrow Cooling Columns	C1 A1	
	Ivory's Rock South Ipswich	A3 C1,E1	
	Laminton volcanics peaks include. Moogerah Peaks, Mt Greville,Mt French	D1,B1,A3,D1,E1,C1	
	Coalstoun Lakes & Dundurrah Lava Tube	A1, C1,B1,A3,E1	5
	Mt Pinbarren	B1,E1,D1	
	Mt Barney igneous complex	A1,C1,A3	
	Mt Cooroy	C1	7,8,9
	Noosa National Park	A1 C1,B1,E1	2,5,10
	Monsildale Gabbro	C1	
	Glasshouse Mountains	A1 B1,C1,D1,E1,A3	
	Kangaroo Point Cliffs and sedimentary dyke	C1 A1,B1, E1	
	Mapleton/ North arm volcanics	D1,A1	
	Mount Tamborine Pillow Basalts	C1 A1,D1	
	Childers Basaltic plateau	C1, A1,D1	
	Manneum Creek Cooling Coumns	C1 A1,D1	
	Somerset Dam	C1,D1,A1	
Sites of structural or stratigraphic significance	Shorncliffe deformed sedimentary rocks and fossil site	C1	

	<b>Lutwyche Rd unconformity</b>	<b>C1</b>	
	<b>Salisbury Unconformity</b>	<b>C1</b>	
	Kitchener Rd unconformity	C1	
	<b>Vulture Street Folds</b>	<b>C1</b>	
	Readymix Quarry Ashgrove	C1	
	Macquarie Street Structural Geology	B1 C1	
	<b>Pine Mtn Serpentinite and related mine</b>	<b>C1</b>	
	<b>Lake Kurwongbah Metamorphics</b>	<b>C1</b>	
	Pentex St coal-bearing sediments	C1 A1	
	<b>Mt Elphinstone</b>	<b>C1</b>	
	<b>Mount Gravatt Folded Cherts</b>	<b>C1</b>	
Fossil Sites	Triassic Plant Locality, Dinmore Quarry	A1 C1, B1,	3
	Tertiary Fossil Plant locality, Dinmore	A1 B1,C1,A3	3
	<b>Brassal Quarry, Triassic fossil plant locality</b>	<b>C1</b> <b>B1</b>	<b>3</b>
	<b>Baroone Rd fossil insect locality</b>	<b>A1</b> <b>B1,C1</b>	<b>3</b>
	<b>Mount Crosby Fossil Insect Locality</b>	<b>B1</b> <b>A3, C1,A1</b>	<b>3</b>
	<b>Cordalba Triassic invertebrate marine fossil site</b>	<b>A1,B1,C1</b>	
	<b>Woodnum Triassic fossil invertebrate locality</b>	<b>A1</b> <b>B1,C1</b>	<b>3</b>
	<b>Redbank Plains fossil vertebrate site</b>	<b>A1</b> <b>B1,C1</b>	<b>3</b>
	Chingee Ck plant locality	A1	3
	<b>Wivenhoe fossil plant and insect localities</b>	<b>A1</b> <b>B1,C1</b>	<b>3</b>
	<b>Torbanlea-Hervey Bay Rd invertebrate fossil locality</b>	<b>C1</b> <b>A1</b>	<b>3</b>
	Denmark Hill Triassic fossil site	A1 B1,C1	3
	<b>Murgon Jurassic invertebrate locality</b>	<b>A1</b> <b>B1,C1</b>	<b>3</b>
	<b>Murgon Vertebrate Fossil Site</b>	<b>A1</b> <b>B1,E1,C1, D1</b>	<b>3</b>
	Narangba Fossil Plant locality	A1 C1,B1	3
	Brisbane River Temnospondyl locality	A1 C1	
<b>Weathering and erosion</b>	<b>Ravensbourne Sandstone Caves</b>	<b>A1</b> <b>C1,E1</b>	<b>2</b>
	<b>Sea Caves and Cliffs, North Stradbroke Island</b>	<b>A1</b> <b>A2,E1</b>	<b>10</b>
	<b>Bunya Mountins Basalt Caves</b>	<b>A1</b> <b>B1,C1, A2,A3,D1,E1</b>	
	<b>St Helena Island</b>	<b>A1</b> <b>C1, E1, D1</b>	<b>10</b>
	<b>Natural Bridge Numinbah</b>	<b>B1</b>	

	<b>Valley</b>	<b>C1,A3</b>	
	<b>Turtle Rock Caves</b>		
	<b>Flagstone Creek Caves</b>	<b>A1,B1 C1, D1</b>	<b>2</b>
	<b>Mount Tamborine Bauxite</b>	<b>C1 A1,D1</b>	
	<b>“Mystery Craters” Kolan</b>	<b>A1 C1,E1</b>	
	<b>Laterite Profile, Woody Point</b>	<b>A1 C1</b>	<b>10</b>
	<b>Deception Bay Concretionary Structures</b>	<b>C1 B1</b>	<b>10</b>
	<b>Cave In Valley, Mount Gravatt</b>	<b>B1 C1, A3</b>	<b>2</b>
	<b>Blackdown tableland escarpment</b>	<b>B1,C1,D1,A3,E1</b>	
<b>Soil Sites</b>	<b>Cooroy Xanthozem</b>	<b>D1</b>	
	<b>Hillfan and xanthozem, Kin Kin Rd, Cooroy</b>	<b>D1</b>	
	<b>Motham Mtn podsol</b>	<b>D1</b>	
	<b>Palmwoods</b>	<b>D1</b>	
	<b>Snake Gully crossing soloth</b>	<b>D1</b>	
	<b>Kenilworth Rd soil on Tonalite</b>	<b>D1</b>	
<b>Other ungrouped sites</b>	<b>Aspley Mudsprings</b>	<b>C1 B1</b>	
	<b>The Narrows, Gladstone</b>	<b>A1,B1,C1,D1</b>	<b>10</b>



# 2. SITES OF GEOHERITAGE SIGNIFICANCE

## 2.1. GREAT SANDY REGION AEOLIAN COASTAL LANDFORM SITES

### **Giant sand dunes, Moreton Island.**

Moreton Island contains Pleistocene to Holocene dune systems, including the highest coastal aeolian dune system in the world. It is a key research and teaching site conveying geomorphological and climatological information

#### Conservation Note

The most significant dune system is protected in the vicinity of Mt Tempest, part of a national park.

### **Bribie Island**

Bribie Island differs from many of the larger sand islands in the region, by being much younger in age. The island developed essentially from beach ridge sets of Quaternary age. The area is significant in its distribution of younger sand bodies, is a key teaching site in close proximity to Brisbane.

#### Conservation Note

The area is under increasing pressure from urban sprawl, but significant areas of the island have been protected in state forest and National park.

### **Cooloola Noosa River Area**

This large area contains multiple generations of aeolian dune system landscape information, and is one of the most significant geomorphological areas in its class. It contains dune systems dating back to the late Tertiary. It contains examples of perched lake systems, development of soil profiles dating back to the late Tertiary, coastal beach ridges, active and fossil aeolian systems in clearly demarcated geomorphological zones.

#### Conservation Note

Most, but not all the area is protected within National park. Careful monitoring of more ancient dune sets should be maintained in order to retain their significance.

#### **Amity Point fossil reef site**

Located on North Stradbroke Island, and exhumed during mining operations, fossil Pleistocene coral reefs were examined by Pickett et al. (1989). The site is the only Pleistocene reef site in South East Queensland, and is the site of well dated records of higher sea level, past environmental records.

Conservation Note.

This area is potentially very important, and should be protected from disturbance.

#### **Fraser Island**

Fraser Island, already on the world heritage list, contains a variety of landscapes related to the development of the largest sand island in the world. These include the presence of perched and window lakes, the formation of organic rich consolidated layers (called coffee rock), 300,000 year old petrified wood and some of Australia's most pristine water bodies.

Conservation Note

This highly sensitive area has significant protection under both National parks and world heritage status.

#### **Deception Bay Beach ridges**

This site consists of beach ridge accumulations along the Deception Bay esplanade, with associated shoreline gravels, sand ridges, lateritic profiles. This site is believed to be substantially younger than other dune systems in SEQ.

Conservation Notes

Dune systems are particularly susceptible to many forms of degradation and development of the site, use of vehicles within the dune system and degradation of vegetation cover are the most significant problems anticipated.

## **2.2 SITES RELATING TO VOLCANISM AND IGNEOUS ACTIVITY**

### **2.2.1 Lamington Plateau Volcanic site group**

#### **Mount Barney Igneous Complex**

The Mt Barney intrusive complex was originally described by Stephenson (1959). It consists of a complex related to the development of the Lamington Volcanics which have intruded sparsely fossiliferous Carboniferous rocks. The dykes and stock of the consist of granophyre and rhyolite. It is a significant record of Tertiary subsurface volcanic activity.

Conservation Note

The site is relatively robust and has adequate protection within a National Park

#### **Lamington Volcanics Sites: Moogerah Peaks**



Tertiary intermediate- acid igneous rocks have intruded Jurassic and Triassic sediments and are preserved in the Mount Alford- Glennie Peak Area, Mount French and . The site consists of a stock of microdiorite, andesite and granophyre intruded in turn by rhyolite, trachyte and lesser basalt. The area also contains breccis pipes, plugs and sills.

The area is a significant site recording the history of Tertiary volcanism in SEQ, they are important teaching and research sites and important local recreation sites.

#### Conservation Note

All sites are robust and afforded adequate protection within National parks.

### **Minto Crags ring dyke**

The Minto Crags ring dyke is located at Mt Minto, 5km southeast of Mount Alford Township, within the Boonah LGA. The ring dyke system was described by de Jersey et al. (1976). It consists of fine grained rhyolites which have intruded the Walloon Coal Measures. The dyke system is Oligocene in age. This is one of the few ring dyke systems in Australia. It is a significant teaching area, of particular aesthetic appeal. Current integrity and condition are good.

#### Conservation Note

The area should be protected from large scale quarrying, but is otherwise robust.

### **Ivory's Rock South Ipswich**

Ivory's Rock is one of the more northerly eruption centres within the Lamington Volcanics, consisting of rhyolite, trachyte, breccia and lesser obsidian. It is a significant record of volcanism in the region, and is an important teaching site. It is a local landmark and popular tourist destination.

#### Conservation Note

The area is robust and apart for major quarrying requires no further protection.

## **2.2.2 Main Range Volcanics group of sites**

### **Manneum Creek Cooling Columns**

Tertiary basalts of the Main Range volcanics are exposed in a small gorge cut by Manneum Creek. The creek has exposed cooling columns up to 15m high on either side of the gorge. These columns result from polygonal cracking of the basalt during cooling of the lava. This is an important teaching site, and potentially a research site into the Tertiary volcanic history of the region.

#### Conservation Notes

Unless quarrying activity takes place the integrity of the site should be preserved. They are relatively robust.

### **Bunya Mountains Basalt Caves**

Caves are located within the Main Range Volcanics (Tertiary) in a small cliff face near Cattle Creek. The caves were described by Graham (1971) and Wood (1976). The caves have formed in joint systems within the basalt and are significant for this reason

#### Conservation Note

National Park Status is current for this area.

### **Mount Marrow Cooling Columns**

This active quarry contains basalt cooling columns and is a useful, but not vital teaching site. Previously included within potential sites, it should be regarded as a lower priority. The assessment panel determined that this site was clearly below threshold.

### **2.2.3 Glasshouse Mountains**

These spectacular exhumed volcanic plugs represent one of the outstanding features of southeastern Queensland. They record the locus of Tertiary rhyolitic volcanic activity, and are a significant tourist attraction. Their significance as a teaching, recreational and research site is unquestioned.

#### Conservation Notes

The protection of both forest reserves and National Parks provides adequate coverage for these sites. Pedestrian access should be restricted where fragile rock faces can be identified. Advent of proposed quarrying expansion in the area should be closely monitored and controlled to retain any aesthetic value.

### **2.2.4 Other sites relating to volcanism or igneous activity**

#### **Childers Basalt Plateau.**

This large area represents examples of the influence of Tertiary age volcanism on the distribution of soils and the development of the modern landscape. Deep kraznozems soils are developed on the basalt plateau, important for the agricultural and socio-historical development of the area. The development of the plateau strongly affected the drainage pattern of the surrounding region. The area contains a wide range of teaching and research sites, particularly in relation to soil sciences and geomorphology.

#### Conservation Notes

The regional integrity has not and is not being affected by any agricultural activities.

#### Tamborine Pillow Basalts

Located on the Oxenford Tamborine Rd, the pillow basalts crop-out within a road cutting. They are part of the Neranleigh-Fernvale metamorphic complex, and their occurrence demonstrates the eruption of basaltic lava onto the sea floor during deposition, in the Carboniferous. It is a useful teaching site, but is badly weathered.

#### Conservation Notes

The greatly deteriorated state of these exposures has lessened their significance, and utility, and further action is unnecessary. Their value could improve with an expansion of the road

#### Monsidale Gabbro

Several outcrops of orbicular gabbro occur within rural land near Monsidale. These orbicular gabbros are relatively rare, and are a useful teaching resource. Given the location and distance of the site from population, there seems no need to prioritize the site.

#### Conservation Note

Disallow quarrying activity of this material.

#### Kangaroo Point Cliffs and sedimentary dyke

This prominent Brisbane landmark is also a useful teaching site demonstrating Triassic volcanic activity, and the presence of a sedimentary dyke illustrates subsurface sedimentologic processes.

#### Conservation Note

The site has protection as a result of its use as a recreation area, and its proximity to the Brisbane River and the city centre.

#### Mt Cooroy

Located 4km east of Cooroy, Mt Cooroy is a small Tertiary volcanic plug which intrudes Triassic country rock. It is a prominent local landmark and a fine example of a volcanic plug. A small quarry on the flanks of the mountain provides good access to fresh exposures of the volcanic material.

#### Conservation Note

Provided no further megaquarrying takes place, the site should require little further protection

#### Mt Pinbarren

Mt Pinbarren is a proud-standing Tertiary age volcanic plug related to the Mt Bauple volcanic complex, north of Gympie. It represents typical development of such plugs in the region.

#### Conservation Note.

The locality is confined and protected by National Park.

#### Noosa National Park

In the vicinity of Granite Bay and Dolphin Point a series of basaltic dykes intrude the Tiaro Coal measures. At Dolphin Bay basalt dykes intrude the country rock, some vesicular, with chill margins. Quartz diorite near Granite Bay is intersected by aplite dykes.

The site is an excellent example of regional intrusives and is an important teaching site.

#### Conservation Note

The site is robust and is protected within the Noosa National Park.

#### Mapleton, North-Arm Volcanics

Triassic volcanics crop-out with interbedded sediments over a wide area on the Gympie 1:250 000 geological sheets. It includes many examples of Triassic volcanism. As noted in the datasheets, the panel considered the sites to be above threshold, particularly the localities within Quarries near Mapleton.

#### Conservation Note

Given the abundance and robust nature of localities, there should be no need for further action.

#### Somerset Dam Layered intrusion

The Somerset Dam layered intrusion an important example of a lithologically zoned intrusive within South East Queensland. The intrusion consists of layered gabbroic rocks, associated quartz diorite, granophyre and country rocks. The site is a significant teaching site.

#### Conservation Note

The site is robust, and is unlikely to suffer from anything but megaquarrying.

## 2.3 FOSSIL SITES

#### Dinmore Triassic Fossil Plant Locality

This recently disused quarry contains excellent and abundant examples of Triassic plant life within exposures of the Ipswich Coal Measures. It is a type fossil locality site for a large number of fossil plant taxa, and a smaller number of fossil invertebrates. The fossil sites include the tailings heaps from the Mining operations of the Rhonda quarry.

#### Conservation Notes

The site is subject to spasmodic collection by both amateurs and professionals, and still yields high grade material. Control of the site by Claypave Pty Ltd has recently limited entry due to insurance reasons. Given the common and intense research which has been undertaken on floras and faunas from this quarry, there is no urgent requirement for protection of the locality.

#### Baroone Rd fossil insect locality

So far mostly undescribed, this site is a Triassic age insect fossil sites in Australia, and will provide a unique insight into the evolution of the terrestrial biota. It is the type locality for *Lithosmylidiia baronne* Lambkin, 1988.

The site is a potentially important research site, which would require significant collection to assess its full value.

#### Conservation Note

The site is located within a road cutting on the Baroone Rd, and is sufficiently removed from Brisbane, to be under threat from over collection. Any upgrade of the road should be accompanied by full collection and recovery of material.

#### Redbank Plains Fossil Vertebrate locality

This diffuse site has yielded much knowledge on the Eocene floras and faunas of Australia, in particular the fishes. Birds and reptiles, insects and plants are all known from this site.

#### Conservation notes.

The area is subject to potential urban development, and overcollecting. Recently Rix & Simpson (1997) reported that the area was under consideration for protection by the Ipswich LGA as a reserve for scientific purposes. Such a reserve should be supported.

#### **Cordalba Triassic Invertebrate Marine fossil site.**

Fleming (1966) described a number of bivalve taxa from sites within the Cordalba State Forest. This is one of the few examples of marine Triassic fossils on continental Australia, and whilst the localities are poor, they are an important record of the EoTriassic in eastern Australia.

#### **Conservation Note**

The site, due to its poor preservation, is unlikely to attract non-research collection. It is in a relatively inaccessible area and has adequate control by State Forest.

#### **Woodnum Triassic fossil invertebrate site**

This site, located in cuttings north of the abandoned Woodnum Railway Station contain one of the few Early Triassic marine fossil sites on the Australian continent. The fauna has been described by Runnegar (1969) and Runnegar & Fergusson (1969), and is under current research investigation.

#### **Conservation Notes**

In the 1960s the expansion of the railway line in the area allowed for a substantial and significant collection to be made. Further expansion or earthworks in the vicinity should be accompanied by a full palaeontological investigation.

#### **Murgon Jurassic Fossil Insect locality**

Located in a road cutting close to Murgon, this site has received no formal attention and requires further field assessment to establish its significance and sensitivity. This is one of the only Jurassic insect sites in Australia and potentially is of great importance to the development of the Australian terrestrial invertebrate biota.

#### **Conservation Notes**

Full collection and research needs to be undertaken on this site.

#### **Dinmore Quarry Tertiary fossil site**

This site is closely related to the Triassic site within the Dinmore Quarry, consisting of Tertiary (Palaeocene) units unconformably overlying the Triassic sediments. These contain an abundant fossil flora, and minor invertebrates providing an important and unique insight into the development of the Australian flora. Whilst there have been significant collections made, the site is under study by Dr Pole (University of Queensland). Similar consideration should be given regarding the conservation of both the Triassic and Tertiary sites (see above).

#### **Mount Crosby fossil insect locality**

Located within a pipeline easement near colleges crossing, 2.5km SW of Mount Crosby. The site is an important fossil type locality which has yielded a large number of fossil insect taxa. One of the few sites of such richness and diversity of its age in Australia.

#### Conservation notes

Active amateur collection is an unlikely, but potential problem, given that the majority of the material is tiny and fragmentary. Further quarrying activity should be avoided, but the site should be left open to bona fide researchers, with collected material deposited at an appropriate institution.

#### **Murgon Tertiary Fossil Site**

Consisting of bone-bearing alluvial sediments located on a rural property, the Murgon Fossil site is one of the few Early Eocene vertebrate fossil sites in Australia. It is a type locality for a large number of fossil vertebrate taxa including crocodiles, dasyurids and other mammals. It is an area of intense research effort and will continue to be so for at least a number of decades.

#### Conservation Notes

The intrinsic value of the site rests with the material which has and will be collected from it. The site is on private land and the owners monitor access, restricting it to *bona fide* researchers. The site consists of pits and excavation sites, which can only be improved by further careful excavation into the future. It is imperative that no impediment be placed between research access to this site.

#### Triassic Plant Locality Brassal Quarry

The quarry exposes Ipswich Coal Measures and is an important teaching site, as well as containing an important record of the Triassic floral history of Australia. The Quarry is much degraded, but potentially could yield new information. The locality is a type fossil locality.

#### Conservation Note

Given the greatly degraded state, no further action should be necessary.

#### Chinghee Creek fossil plant locality

This is a poorly defined locality which requires field truthing. Current data are sketchy. The site is a Tertiary fossil plant locality one of very few on the Lamington Plateau, a region of great importance to the floral evolution of the continent. However the absence of accurate locality data prevents its consideration as an above threshold site.

#### Wivenhoe Fossil Plant localities

The foreshores of Lake Wivenhoe contain a number of localities rich in Triassic plants and more rarely, insect remains. The Wivenhoe sites include fossil type localities near Bellevue Homestead, and localities in a number of road cuttings along the old Ipswich-Esk Road. These are significant research sites, and have recently yielded rare insect remains. Many original fossil type localities have been inundated by the waters of Lake Wivenhoe.

#### Conservation Notes

The sites within the Wivenhoe Dam catchment have restricted access, controlled by the Ranger station at the dam. No other protection should be necessary.

### Torbanlea-Hervey Bay Cretaceous fossil locality

Since the demise of the Corporation Quarry at Maryborough, this site is chosen as an excellent example of the early Cretaceous (Aptian) marine faunas, and outcrops of the Maryborough Formation. Whilst not a fossil type locality, it is an important research site.

#### Conservation Notes

No action should be required, road widening may refresh the exposures in the future and such activity should be accompanied by collection activity.

### Narangba Plant Locality

Fossil plants occur within highly weathered sandstones of the Landsborough Formation, exposed within a quarry adjacent to the Narangba Rd. Continued quarrying may enhance and refresh exposures.

## **2.4. STRUCTURAL AND STRATIGRAPHIC SITES**

### Shorncliffe, deformed sedimentary and fossil plant locality

This site is a type locality for a number of fossil plant taxa, and illustrates the deformation history of the Moreton Basin.

#### Conservation Notes

The area is subject to degradation by weathering and pedestrian access, but is unlikely to be significantly degraded except by large scale quarrying or urban development.

### Lake Kurwongbah Metamorphics

This is an important teaching site demonstrating the metamorphic and structural history of the region. The site consists of metavolcanics outcropping in the spillway zone of the dam.

#### Conservation notes

Without further large scale development of the dam and spillway the site will only suffer from weathering.

### Vulture Street Folds

Foliated rocks of the Bunya Phyllite are exposed in road cuttings adjacent to Somerville House Girls School demonstrating a complex and informative structural history. This is an easily accessible and useful teaching site.

### Readymix Quarry Ashgrove

Quarrying activity has revealed the contact between the Enoggera Granite and the Bunya Phyllite, with the associated contact metamorphic aureole. This is a valuable local teaching site illustrating both regional and contact metamorphic processes. Only infill can degrade the site integrity.

### **Mount Gravatt Folded Cherts**

This is a first class exposure of chert units within the Neranleigh-Fernvale Metamorphic complex, demonstrating deformational history and sedimentology of the units. It is an important teaching site, exposed within a road cutting.

### **Conservation Notes**

The sites robust features make it resilient to all but mass quarrying. It lies within a reserve of the Brisbane City Council.

### **Kitchener Rd Unconformity**

Folded metamorphics are unconformably overlain by breccia. It is a useful teaching site.

### **Lutwyche Rd Unconformity**

This is a useful and readily accessible teaching site demonstrating the structural complexity of the metamorphic complex, and the relationship

### **Pentex St coal-bearing sediments**

This site near Salisbury demonstrates the sedimentological development of local coal measures and is thus an important teaching site. Its current state can only be determined by field work.

### **Macquarie St Structural Geology**

Intensely deformed metasediments are well exposed in a road cutting and are an informative and readily accessible teaching site.

### **Salisbury Unconformity**

Located near Nathan demonstrates the relationship between the Neranleigh-Fernvale metamorphics and younger sediments of the Moreton Basin. It is a useful teaching site.

### **Mt Elphinstone**

Located close to the Brisbane suburb of Kenmore, Mt Elphinstone site contains examples of Carboniferous volcanics within the Neranleigh- Fernvale metamorphic complex, it is an important teaching site.

### **Conservation Note.**

The site is unlikely to be developed as a residential area, due to topography. The outcrops are robust and should not require specific action.

### **Pine Mountain Serpentinite**

Small outcrops of serpentinite, and other altered ultramafics are found near the Pine mountain hall NW of Ipswich. There are small amounts of nickel and chromium minerals associated with the outcrops. The site is an important regional example of ultramafic volcanism and related metamorphism and metasomatism.

### **Conservation Note**

The site is robust, undergoing natural weathering. It should require no further action.



## **2.5 WEATHERING AND EROSIONAL FEATURES**

### **Woody Point Laterite Profile**

This site developed in cliffs near Woody Point demonstrates laterite profile development within sandstones and basalts, and is a significant teaching site for geological and geomorphological processes.

### **Conservation Notes**

Given that the area is reserved park land, further protection from development seems unnecessary. If zoning were to change, this would require reassessment.

### **Mount Tamborine Bauxite**

A small quarry on the summit of the Tamborine Plateau has exposed a bauxitic laterite profile, which is a valuable teaching site illustrating the weathering and climatologic history of SEQ. It is in a much degraded state.

### **"Mystery Craters" Kolan**

The craters, a misnomer, consist of sink holes within Tertiary laterite profile and are significant due to their concentration. They are of slight teaching interest, but are importantly a local tourist attraction.

### **Concretionary Structures Deception Bay**

Outcrops of the Landsborough Formation are preserved on rock platforms at Deception Bay. The rock contains unusual concretionary structures relating to the diagenetic history of the unit. Cementation of the rock has resulted in the spherical and distorted spherical structures up to a metre in diameter. It is an instructive site for the sedimentology of the Landsborough Formation and the development of these diagenetic structures.

### **Conservation**

The locality lies within the intertidal zone and is unlikely to be disturbed except by marina development.

### **Flagstone Creek Caves**

These greatly degraded alluvial caves, near Helidon, are similar but less stable than that at Mount Gravatt.

### **Mount Gravatt Cave in Valley**

A cave formed in alluvial debris near Mount Gravatt is a useful geomorphologic teaching site and demonstrates the development of such features by "piping".

### **Conservation Note**

It is located within a recreation reserve and is relatively robust.

### **St Helena Island**

This small island within Moreton Bay consists of a Tertiary basalt, with associated fringing basaltic gravels, coralline and shelly beds of beach rock. The association of bedrock and related fringing sediments makes it an excellent teaching area for both geology and

geography, relating to changes in sea level during the Holocene and landscape evolution relating to island environments

#### Conservation Notes

St Helena is a National Park

#### **Ravensbourne Sandstone Caves**

Located in and adjacent to the Ravensbourne National Park the caves (3 in total) represent erosion of quartzose sandstone below a silcrete horizon. Caves are also home to a resident bat colony (*Rhinolophus megaphyllus*). The site is an important teaching resource for both geology and zoology, and is a local tourist attraction. It demonstrates weathering and erosional features and cave development which is extremely uncommon.

#### Conservation notes

Two of the caves are within the National Park, and the third lies adjacent to the park. Pedestrian access should be restricted to the caves and mining, quarrying or increased access to the third cave should be restricted.

#### **Natural Bridge, Numinbah.**

This local landmark formed from the cave collapse of Tertiary volcanic rocks which were scoured by a waterfall. The site is an important tourist attraction, and an unusual erosional feature.

#### Conservation Note

The site has adequate protection within a National Park.

#### **Turtle Rock Caves**

caves are developed along joint surfaces within rhyolites of the Lamington-Tweed volcanics near Springbrook. The caves are an unusual geomorphological feature, unique to the region, with additional local significance for tourism. The area is close to Lamington national Park.

#### Conservation Note

The site is highly susceptible to increasing pedestrian access and should be closely monitored.

#### **Blackdown Tableland**

The escarpment of the Blackdown Tableland is an extensive set of cliffs which provide a geographic and biological boundary to the insular Blackdown tablelands. The cliffs are steep, and present the best exposures of the Precipice Sandstone within the region. They are of great teaching, local tourist and potentially research significance.

#### Conservation Note

The cliffs can only be seriously damaged by megaquarrying, but other conservation values in the area render the area sensitive.

## **2.6 SOILS SITES**

As part of the assessment process the identification of soil sites was clearly problematic. A small arbitrarily selected number of soil sites are included in the dataset. These represent only a very few of the potentially hundreds of soil benchmark sites. Major databases of soil sites are held by CSIRO Soils Division, Townsville and the Queensland Department of Natural Resources. Time and budgetary constraints prevented full assessment of these site data, and soil sites are left as a major gap in the Geoheritage record.

Table 2.1 lists the included sites, with as full a data record as possible in the Appendix.

## **2.7 OTHER UNGROUPED SITES**

### **Aspley Mudsprings**

Artesian water created a series of sporadically active mudsprings on the corner of Hawbridge and PT road Aspley. There have been no records of activity since that of Willmott et al. (1981). The committee determine the site to be below threshold.

### **The Narrows**

The Narrows falls just outside the study area, with its southern border at Gladstone Harbour. The Narrows are a large, ecologically diverse set of intertidal channels between Curtis Island and the mainland which exhibits a number of important features of tropical intertidal estuarine sedimentation. In addition the site is adjacent to the Rundle Oil shale deposit which has a diverse fossil assemblage.

### **Conservation Note**

The size and nature of the environment negates urgent conservation action, however the opening of the Rundle Oil Shale should be accompanied by palaeontological collection.

# 3. CONCLUSIONS

## 3.1 LIST OF SITES ABOVE THRESHOLD

The following sites were determined by the assessment committee to be above threshold value.

Giant Sand Dunes Moreton Island  
Bribie Island  
Cooloola-Noosa R.  
Amity Point fossil reef site  
Fraser Island  
Deception Bay Beach ridges  
Minto Crags Ring Dyke  
Ivory's Rock South Ipswich  
Laminton volcanics peaks include. Moogerah Peaks, Mt Greville, Mt French  
Coalstoun Lakes & Dundurrah Lava Tube  
Mt Pinbarren  
Mt Barney igneous complex  
Mt Cooroy  
Noosa National Park  
Monsildale Gabbro  
Glasshouse Mountains  
Kangaroo Point Cliffs and sedimentary dyke  
Mapleton/ North arm volcanics  
Mount Tamborine Pillow Basalts  
Childers Basaltic plateau  
Somerset Dam  
Shorncliffe deformed sedimentary rocks and fossil site  
Lutwyche Rd unconformity  
Salisbury Unconformity  
Vulture Street Folds  
Pine Mtn Serpentinite and related mine  
Lake Kurwongbah Metamorphics  
Mt Elphinstone  
Mount Gravatt Folded Cherts  
Brassal Quarry, Triassic fossil plant locality  
Baroone Rd fossil insect locality  
Mount Crosby Fossil Insect Locality  
Cordalba Triassic invertebrate marine fossil site  
Woodnum Triassic fossil invertebrate locality  
Redbank Plains fossil vertebrate site  
Wivenhoe fossil plant and insect localities  
Torbanlea-Hervey Bay Rd invertebrate fossil locality  
Murgon Jurassic invertebrate locality  
Murgon Vertebrate Fossil Site  
Ravensbourne Sandstone Caves  
Sea Caves and Cliffs, North Stradbroke Island  
Bunya Mountins Basalt Caves  
St Helena Island  
Natural Bridge Numinbah Valley  
Turtle Rock Caves

Flagstone Creek Caves  
Mount Tamborine Bauxite  
“Mystery Craters” Kolan  
Laterite Profile, Woody Point  
Deception Bay Concretionary Structures  
Cave In Valley, Mount Gravatt  
Blackdown tableland escarpment  
Cooroy Xanthozem  
Hillfan and xanthozem, Kin Kin Rd, Cooroy  
Motham Mtn podsol  
Palmwoods  
Snake Gully crossing soloth  
Kenilworth Rd soil on Tonalite  
The Narrows, Gladstone

## 3.2 KEY FINDINGS

In general geological heritage sites require lower levels of conservation management. The exceptions are the aeolian coastal systems which require high levels of conservation management. Most of the sites identified in the study are robust, and are little affected by all but quarrying activity.

Fossil sites are in a significantly different category to all other sites of geological significance. Their value lies in the material removed from them and placed within scientific institutions. Only rarely do fossils in their field locations retain their value, as they weather and deteriorate quickly. Sites must be available to researchers to maintain their integrity. Thus most fossil type localities need not necessarily be on the national estate register.

The lack of readily available data on soil sites has left a serious deficiency in this report. The soil sites within the CRA need significant attention, as the committee feels that there are hundreds of potential soil benchmark sites. The data for these are held by CSIRO and other state government departments.

## 3.3. KEY RECOMENDATIONS

- Soil sites to be investigated further.
- Fossil sites to receive different consideration within the Geoheritage assessment and to remain accessible to researchers without further impediment and not necessarily on the National estate register.
- Stratotype sites to be available for research.
- Development of fossil sites for any other purpose should be accompanied by adequate collection.



## **APPENDICES**

### **Appendix 1. Locality Map for Indicative Sites of Geoheritage significance**





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## **GLOSSARY**

**Type fossil:** a specimen of material designated by original formal description to be characteristic of that fossil species. This may be a Holotype, paratype, lectotype, neotype and so on. Type specimens must be lodged with an internationally recognised institution.

**Type locality:** Locality from which a type fossil is derived.

**Stratotype:** Sequence of a stratigraphic unit designated to be the typical and reference section for that unit. Generally this has one surface locality, but many are represented by drill core.





## **ABBREVIATIONS**

Unofficial codes used in Data Compilation

VP- Vertebrate Palaeontological Site

IP - Invertebrate Palaeontological Site

PP - Palaeobotanical Site

Tr - Triassic

Ju - Jurassic

K - Cretaceous

Te - Tertiary

dy - Dyke

tuff - Tuff

Meta - Metamorphic Site

RD - Ring Dyke

