# GEOLOGICAL, CULTURAL AND HISTORICAL WONDERS OF NSW

### **FAR WEST**

**Albert Kertsen Mining and Mineral Museum** Broken Hill The Living Desert **Broken Hill Ore Deposit** Cobar Copper and Mining Heritage **Historic Day Dream Mine Tours** Kinchega NP **Lake Peery Mound Springs Lightning Ridge Opal Fields** Lightning Ridge Bore Bath Mutawintii National Park Sturt National Park and Tibooburra Dome The Great Australian Basin (Artesian Basin) White Cliffs Opal Field

**Broken Hill** 

Wilcannia.

**FAR WEST** 

### **MURRAY**

Mungo NP and Lunette **Perry Sand Hills** Willandra Lakes World Heritage Area

Mildura

#### **ORANA**

Crystal Kingdom Mineral Museum Mt Kaputar NP and Waa Gorge Pilliga Sandstone Caves Rocky Creek Glacial area Bourke Sawn Rocks—Mt Kaputar NP **Tambar Springs Diprotodon** Warrumbungle NP **Wells Gem and Mineral Collection** 

## **ORANA**

#### **CENTRAL WEST**

Age of Fishes Fossil Museum Canowindra **Australian Fossil and Mineral Museum** Cobar . Coolah Tops NP **Gulgong Gold Rush Heritage** Hill End Gold Rush Heritage **Ophir Gold Field** 

Wellington Caves and Phosphate Mine

Peak Hill Open Cut Gold Mine

Dubbo

Orange

### Moree

## **NEW ENGLAND**

#### **NEW ENGLAND**

**Ashford Caves Bald Rock NP** Cathedral Rock NP Cranky Rock Nature Reserve Ebor Falls—Guy Fawkes NP Oxley Wild Rivers NP Three Creeks Tourist Gold Mine Mt Yarrowick Nature Reserve

## **HUNTER**

### **HUNTER VALLEY Battery Hill Columnar Jointing**

**Burning Mountain** Catherine Hill Bay Glenrock State Recreation Area **Hunter Valley Coal Heritage** Swansea Headland Petrified Forest

## Lismore

Clarence Headland weathering Fingal Head Wollumbin/Mount Warning Shield Volcano

**NORTHERN RIVERS** 

## **NORTH COAST**

#### Coffs Harbour

### **MID NORTH COAST**

**Alum Mountain** Diamond Head Crowdy Bay NP Hat Head National Park Lorne Basin, Lansdowne Escarpment and Big Macleay Valley Past sea level impacts **Port Macquaries Geological Block** Red Rock Headland

## **Taree**

#### **CENTRAL COAST**

The Skillion at Terrigal

### Newcastle

### SYDNEY AND SURROUNDS

Diamond Hill Kurrajong Dunns Swamp- Wollemi NP The Australian Museum Gardens of Stone NP Jenolan Caves

Kananara Boyd NP Newnes Oil Shale- Wollemi NP The Three Sisters

## Sydney

# **GREATER SYDNEY**

### Wollongong

## **ILLAWARRA**

## **ILLAWARRA**

**Bombo Headland Quarry** Illawarra Coal Measures Illawarra Escarpment Kiama Blow holes

### .Batemans Bay

#### SAPPHIRE COAST

Ben Boyd NP Mimosa Rocks NP Montreal Goldfield

#### **SHOALHAVEN**

**Drawing Room Rocks- Barren Grounds Nature Reserve** Piaeon House Mountain/Didthul and Castle Rock Ulladulla Fossil Walk

### **EUROBODALLA**

Bingie Bingie Point Guerilla Bay **Gulaga/Mt Dromedary Mining** Heritage and Geology Murramarana NP Mystery Bay Heritage Site and Kink Zone Narooma Accretionary Complex and **Chevron Folds** Tilba Cemetery Headland Intrusions

## **CENTRAL WEST**

Eugowra.

Canowindra.

Albury

## **RIVERINA**

**MURRAY** 

Deniliquin .

**RIVERINA** 

Reserve

. Hay

Griffith/Darling Basin

The Rock Nature

. Wagga Wagga

SEE OVER FOR MORE INFORMATION



.Young

#### **ACT Abercrombie Caves**

**Dalton Leaf Deposit** Lake Georae National Dinosaur Museum Canberra Wee Jasper Caves & Fossils Wombeyan Caves

#### **SNOWY MOUNTAINS**

Cooleman Plain Karst The Australian Alps Mt Kosciuszko NP Myanba Creek and Gorge The Blue Lake Tumbarumba Gem Region Yarangobilly Caves and Thermal Pool

Myanba Creek Gorge

#### **FAR WEST**

## Albert Kertsen Mining and Mineral Museum,

Museum displays crystals, mineralogy, metallurgy and Broken Hill's geology.

#### **Broken Hill The Living Desert**

Schist rocks deposited 1600 mya.

#### **Broken Hill Ore Deposit**

One of the world's richest and largest 1800 myo zinc and lead deposits. Discovered in 1883 by Charles Rasp. The Miner's Memorial respects the 800 mining deaths at Broken Hill since 1883.

#### **Cobar Copper and Mining Heritage**

Copper was discovered in 1869 near a waterhole and this became the Cobar Mine. The mine's office is now the Museum. From the viewing platform can be seen the entrance to the underground mine at Fort Bourke. **Historic Day Dream Mine Tours** 

### This was mined before Broken Hill. It had the first smelter in the district and used child labour.

110 km SE of Broken Hill. Contains the Darling basin (100,000 sq km of W. NSW), Devonian sedimentary rocks, alluvial and marine deposits, floodplains, overflow lakes, sand plains and dunes.

#### Lake Peery Mound Springs

Spring water from the Artesian Basin reaches the surface and its sediments and salts make mounds. Lightning Ridge Onal Fields

80 km North of Walgett. It lies in the Surat basin. 110 mya it contained an inland sea. Opals are found in the sedimentary rocks containing silica. (Black opals are found in rocks containing carbon and iron oxide).

#### Lightning Ridge Bore Bath

The water comes from the Artesian Basin and is 2 million years old. It has a constant temperature of 41.5 degrees.

#### Mutawintji National Park

The region had volcanic eruptions, marine and alluvial sediments, mountain building and erosion and weathering. A 400 myo seabed and 650 myo landscape. Sturt National Park and Tibooburra Dome

The dome is caused by granodiorite rocks moving upwards and arching and fracturing the metamorphic rocks above them.

### The Great Australian Basin (Artesian Basin)

The basin underlies 1.7 million square km, 22% of Australia's continent and 12% of NSW. Contains approximately 8700 million megalitres. It is the largest and deepest Artesian basin in the world. Formed during the Triassic, Jurassic and Cretaceous periods.

#### White Cliffs Opal Field

Opals are found in claystone (of marine origin). The field contains opalized wood, shells, fish and reptiles of the lower Cretaceous Age.

#### Mungo National Park and Lunette

148 km north of Balranald. Lake Mungo is part of a chain of freshwater lakes. A lunette consists of layers of sand and silt deposited over tens of thousands of years.

#### **Perry Sand Hills**

6 km north west of Wentworth. Consists of shifting sand dunes formed by wind erosion. It was the site of bombing practice in WWII and for the filming of movies. Skeletal remains of megafauna and Aboriginal sites have been found in the area.

#### Willandra Lakes World Heritage Area

Discovery place of the 40,000 year old Mungo lady and man and ritual ceremony sites.

#### **ORANA**

Crystal Kingdom Mineral Museum, Coonabarabran

Displays minerals and fossils from this region only. Rare zeolite crystals and fossils.

### Mt Kaputar NP and Waa Gorge

This volcanic landscape was formed 17-21 mya. Waa Gorge is 62 km NE of Narrabri and consists of a gorge, gullies, pools and 70 m high cliffs. Mt Waa is a volcanic

#### Pilliga Sandstone Caves

Sediment laid down in the Jurassic period and volcanic eruptions formed the Warrumbungle and Nandewar ranges. The caves north of Coonabarabran were formed by the weathering of the sandstone. Rocky Creek Glacial area

#### Boulders formed by erosion and glaciers 300 mya. Sawn Rocks—Mt Kaputar NP

A 40 metre high cliff face is the remains of the Nandewar's basalt lava flow 21 mya. Hexagonal columns were formed by the basalt cooling, shrinking and cracking.

#### Tambar Springs Diprotodon

The Coonabarabran Visitor Information Centre contains a Diprotodon fossil. This was the largest known marsupial in Australia and became extinct 20,000 years ago. Warrumbungle NP

25 km from Coonabarabran. 17 mya—16 mya volcanic activity built a 1000 m high and 50 km wide cone.

Wells Gem and Mineral Collection At the Warialda Tourist Office. Contains fossils, shells, minerals and gemstones collected by the Wells family.

#### **CENTRAL WEST**

#### The Age of Fishes Fossil Museum, Canowindra

Perfectly preserved 360 myo Devonian fish fossils found 11 km from Canowindra. The Mandageria Fairfaxi is the NSW state fossil emblem. David Attenborough described them as world class!!

#### **Australian Fossil and Mineral Museum Bathurst**

Contains the Somerville Collection- a priceless collection of fossils and mineral specimens.

#### Coolah Tops NP

Basalt plateau originating from vents on the Liverpool range (during the Tertiary period). Five caves (from the Oligocene Age) were formed by groundwater erosion. **Gulgong Gold Rush Heritage** 

#### Once one of the richest gold mining areas in NSW. Hill End Gold Rush Heritage

81 km NW of Bathurst. Gold was found in 1855 at Hill End. There are mine relics, heritage buildings and tours. The Beyers and Holtermann nugget (286kg) was discovered in 1872. Originally there were 8,000 people and 52 hotels.

#### **Ophir Goldfields**

30 km NE of Orange. In 1851, Ophir was the site of the Australia's first payable gold discovery.

#### Peak Hill Open Cut Gold Mine

Gold was discovered at Peak Hill in 1889. From 1893 to 1917, 60,000 oz was removed from underground. Can view the open cut mine on the edge of Peak Hill.

#### Wellington Caves and Phosphate Mine

8 km South of Wellington. The 40 limestone caves are from the Devonian period 405-413 mya. Contains Devonian marine fossils and Pleistocene marsupial fossils.

### RIVERINA

### Griffith /Darling Basin

The Basin contains over 8000 metres of Late Silurian to Early Carboniferous sediments.

#### The Rock Nature Reserve

33 km SW of Wagga. Consists of Upper Devonian Age sediments, quartzite and slate with quartz veins.

NP National Park mya Million Years Ago myo Million Years Old asl Above Sea Level

#### **NEW ENGLAND**

#### Ashford Caves in the Kwiambal NP

Series of caves (containing an outcrop of coralline limestone) in the New England region. **Bald Rock NP** 

North of Tenterfield. Bald rock was formed 247 mya. It is an eselberg and Australia's largest exposed granite

#### Cathedral Rock NP

The National Park sits on a large Triassic granite mass. Weathering has exposed granite tors. Cathedral Rock's granite boulders reach a height of 200 metres. Cranky Rock Nature Reserve

8 Km east of Warialda. Composed of 245 myo Triassic Dumboy—Gragin Granite. Weathering has resulted in the rocks looking like a stack of boulders.

#### Ebor Falls—Guy Fawkes NP

81 km east of Armidale. Tiered 100 m waterfall.

#### Oxlev Wild Rivers NP

Gorges, waterfalls and rivers. Wollomombi Falls have a 260 metre drop.

#### Three Creeks Tourist Gold Mine

Mining site and Museum. Can pan for gold.

#### **NORTHERN RIVERS**

#### Clarence Headland weathering

Honeycomb shaped weathering caused by salt, sand and wind erosion.

#### Fingal Head

Rocks have hexagonal patterns. The columnar jointing is caused by lava cooling and cracking.

#### Wollumbin/Mount Warning Shield Volcano

Near Murwillumbah. Remnant central plug of the Tweed Shield volcano. Example of an erosion caldera. Wollumbin is aboriginal for "cloud catcher".

### **HUNTER VALLEY**

#### **Battery Hill Columnar Jointing**

Between Denman and Merriwa. 35 mya lava erupted and cooled causing jointing in the rocks.

#### **Burnina Mountai**

North of Scone. Oldest known coal seam fire. Has been smouldering for 5,500 years.

#### Catherine Hill Bay

Coal mining /port facility in the 20th Century. Under the jetty is the Great Northern Coal Seam in between the conglomerate rocks. The rock platform contains dolerite dykes.

#### **Glenrock State Recreation Area.**

5 km South of Newcastle. Contains 8 coal seams from the Permian period plus fossil bearing shales. **Hunter Valley Coal Heritage** 

## The Hunter region is Australia's largest coal producing

#### Swansea Headland Petrified Forest

At low tide the rock platform exposes fossilized tree stumps, affected by a volcanic eruption.

#### ACT

### Abercrombie Caves

Caves 70 km S of Bathurst. Contains speleogens, a river and fossil vertebrate deposits.

### **Dalton Fossil Leaf deposit**

21 myo fossil leaf deposit.

One of the world's oldest lakes.

#### National Dinosaur Museum Canberra

Australia's largest permanent display of prehistoric specimens.

### Wee Jasper Caves and fossils

400-415 myo Devonian limestone rocks rich in marine fossils. Careys Cave has seven decorated chambers.

#### Wombevan Caves

500 known caves, 62km west of Mittagong.

#### **SNOWY MOUNTAINS**

#### Cooleman Plain Karst

88 km SE of Tumut. The limestone formed 430 mya. Clarke Gorge and the blue waterholes are popular sites.

#### The Australian Alps

130 mya magma formed a plateau. The Alps are a remnant of this. 50 mya basalt lava erupted over the region and lakes and moraines formed in the Ice Age 10,000 years ago. Mt Kosciuszko NP

Mt Kosciuszko is Australia's highest peak at 2228 metres. Formed by granite rocks, uplifting and faulting. Glaciers were produced in the last Ice Age.

#### Myanba Creek and Gorge South East Forests NP

Cascades and expansive views. Formed on Devonian Towamba Granodiorite ( an ianeous intrusion).

#### The Blue Lake

Cirque lake formed at the head of a glacier 10,000 years ago. 16 ha in size.

#### Tumbarumba Gem region

Region known for fossicking, wine tasting and fishing. Yarrongobilly Caves, and Thermal Pool

A 12 km x 1 km outcrop of coral reef limestone deposited 430 mya. 400 caves and a thermal spring.

#### **MID NORTH COAST**

Set of rocky tors (rocky peaks) that overlook the town of Bulahdelah.

#### **Diamond Head Crowdy Bay NP**

Lava flows from the late Triassic period 200 mya. Hat Head NP

Permian sedimentary rocks plus Permian granite at Smokey

Lorne Basin, Lansdowne Escarpment and Big Nellie The basin is 35 km in diameter with two circular uplifts. Possible meteorite impact site 250 mya.

#### Macleay Valley Past sea level impacts

Region from Kempsey east to the coast. Sea levels were 5 metres higher 120,000 years ago and deposited sand dunes and

#### Port Macquarie Geological Block

Rocky Beach has metamorphic and igneous rocks. Contains the mineral lawsonite which has been found in only ten localities worldwide. Red Rock Headland

North of Coffs Harbour. Consists of sedimentary rocks deposited

#### in the ocean. Deformed, folded and faulted.

#### **SYDNEY AND SURROUNDS Diamond Hill Kurrajong**

200 mya molten rock flowed into a swamp and exploded to form the wide cone formation.

### Dunns Swamp- Wollemi NP

The only known living wild specimens of the Wollemi Pine were discovered in 1994.

#### Triassic, sandstone, and Pagoda rock formations.

#### Gardens of Stone NP

North of Lithgow. Flat coiled ironside within sandstone weathered to form pagodas (conical rock formations).

#### system. Kananara Bovd NP

270 myo Permian Sydney basin rocks and 380 myo Devonian rocks. Valley erosion has been caused by the creek near Kalang

Consist of Narrabeen sandstone with strong vertical jointing and

30 km SE from Oberon. Australia's most outstanding cave

#### Newnes oil shale Wollemi NP

NE of Lithgow. The oil shale torbanite is rich in oil. The Three Sisters

## horizontal layers of ironstone.

Australia's first Museum. More than 21 million specimens and cultural objects.

#### CENTRAL COAST

#### The Skillion at Terrigal

Sedimentary rock formed in the Triassic period. A band of grey shale underlies the sandstone on the eastern side.

#### **Bombo Headland Quarry**

North of Kiama. Shows Permian Gerringong Volcanics. Kiama sandstone member forms a platform and cliff face. 20 metres of porphyritic basalt in the north.

## Illawarra Coal Measures

Coal mining began in 1848 and the coal seam is exposed at Austinmer beach.

#### Illawarra Escarpment

A sheer drop produced by erosion and jointing. Kiama Blow Holes

## **EUROBODALLA**

Consists of two igneous rock types—Tuross head tonalite and Bingie Bingie suite, a dark grey gabbroic diorite. (The Devonian granites are 415-370 myo).

#### Guerilla Bay

#### Gulaga/Mt Domedary Mining Heritage and Geology 17 km from Narooma and west of Central Tilba.

Igneous and extrusive rocks have intruded Ordovician sediments. The main rock types are monzonite and banatite.

Murramarana NP North of Batemans Bay. Consists of the Permian Sydney

### Mystery Bay Heritage Site and Kink Zone

In 1880 Geologist Lamont Young's boat was found on the rocks. The five passengers were never found.

### Narooma Accretionary Complex and Chevron Folds

of the Pacific plates. The vertical glasshouse rocks consist of Narooma Chert.

#### **SHOALHAVEN**

### **Drawing Room Rocks- Barren Grounds Nature Reserve**

A natural rock feature near Berry on the edge of the Illawarra escarpment. Provides excellent views of Kangaroo

720 m asl sandstone laid down in the marine environment during the Permian age 260 mya.

### **SAPPHIRE COAST**

Southern headland at Twofold fold bay Eden consists of a folded sandstone bed. The pinnacles were caused by erosion

Between Bermagui and Tathra.

Folded and faulted sedimentary rocks deposited in the Ordovician period 444-485 mya. Volcanic activity produced coastal formations at Goalen Head, Bunga Head and

#### **Montreal Goldfield**

Gold was mined on the beach. Molten magma cooled to form Gulaga, Mt Dromedary, Little Dromedary and Montague island.

expansive views towards Towamba Valley.













#### Vertical blowhole formed from basalt.

#### Binaie Binaie Point

22 km from Batemans Bay. Some of the oldest rock formations on the east coast. (450 mvo)

### Basin and Ordovician beds.

## Zig zag pattern on the layers of rock caused by the collision

Valley and Berry. Pigeon House Mountain/Didthul and Castle Rock

Ulladulla Fossil Walk Permian marine fossils in the 270 myo siltstone on the Ulladulla rock platforms. There is a geological time walk in

## Brodie Park.

#### Ben Boyd NP

of the Quondolo formation. Mimosa Rocks NP

#### Aragunnu.

7 km north of Bermagui.

Myanba Creek Gorge Located near Bombala. Tumbling cascades and