'Striking Gold through Geotourism'
SMEDG Meeting
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What is the Purpose of Geoscience?

- To explore, develop and explain the links between geological heritage and all other aspects of natural, cultural and intangible heritages.

- By studying these issues, geoscientists, along with other scientists and geographers (all ‘geo-professionals’), can anticipate earth's future and examine any changes that may need to be made.

‘Modern Day Explorers’ – 1978
Early Geotourism Insights

Authored a feature article in a new tourism journal describing the ‘natural heritage’ of the mining area of Chillagoe, FarNQ based on observations as an exploration geologist in the early 1970s.

Geotourism is a natural fit for exploration geologists

- Exploring the opportunity for discovery.
- Love of landscapes/great outdoors/travel.
- Satisfying project work with challenges.
- Learning new skills and knowledge.
- Educating/enthusing others in an outdoor environment - quite different from the museum experience.

Today's Agenda

- Why the AGC interest?
- What is geotourism and its delivery mechanisms?
- The National Geotourism Strategy
- Ku-ring-gai GeoRegion
- The gold in geotourism
- Take-Aways

About the AGC

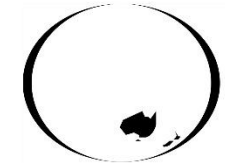
The peak body for Australian geoscience professional societies, representing some 8,000 geoscientists

AUSTRALIAN INSTITUTE OF GEOSCIENTISTS
Supporting Geoscientists

AusIMM

Australian Society of Exploration Geophysicists

PESA
Petroleum Exploration Society of Australia



ANZGG
AUSTRALIAN & NEW ZEALAND GEOMORPHOLOGY GROUP

Australian Geoscience Council Inc.

The Council of Earth Science Societies in Australia

The Australian Geoscience Council Inc (AGC) is the Peak Council of geoscientists in Australia.

The AGC seeks to raise the profile of Geoscience in the broader Australian community by (amongst other strategies) by

- supporting Geoscience education in primary and secondary schools; and
- educating the community through geotourism and outreach.

- Geotourism offers the potential for new industries and employment opportunities for geoscientists through the development of major projects within Australia.

- Geotourism offers one of the best ways to communicate the value of geoscience to the broader Australian community.

Dr Jon Hronsky OAM, Steering Committee Chair

- In Australia, we have embraced the inclusive nature of the geotourism concept and have understood the inter-relationship between natural and cultural heritage elements, but it is not geological tourism.

- By focusing on the geology and geomorphology (i.e., physical geography) as well as the ecology and culture arising from these geological characteristics, it is believed in Australia that geotourism adds considerable content value to traditional nature-based tourism as well as to cultural tourism, inclusive of Aboriginal tourism.

- Geotourism has links with adventure tourism, cultural tourism, ecotourism, wildlife tourism, astrotourism, and agritourism, but is not synonymous with any of these forms of tourism, although in broad terms it embraces them all because it is essentially ‘place-based.’

- Geotourism is undertaken in all areas, including places utilised by people (cultural tourism) and where primary industry activities (i.e., agriculture/agritourism, mining, and forestry) are prevalent, and in areas with Aboriginal land tenure or are subject of cultural interest. It is therefore about the place, regardless of its condition.

Cultural heritage benefits of geotourism

- Holistic Aboriginal Culture elements linked to landscape and astral interpretation ('sky country').
- For Australia, an enhanced understanding of cultural elements of post European settlement.
- Extensive mining heritage.
- Other primary industry and historic cultural elements.

Geotourism: place based and holistic

comprises the following features of both natural and cultural heritage:

- Abiotic – non-living aspects such as the climate & geology e.g. landscape and landforms: GEODIVERSITY
- Biotic – the living parts eg. fauna (animals) and flora (plants): BIODIVERSITY
- Cultural – past & present, non-living and built: HUMAN DIVERSITY

Holistic in scope, geotourism is the key driver for UNESCO Geoparks, World Heritage Areas, and Australian National Landscapes.

UNITED NATIONS

Founded in 1945 - 193 member states

UNESCO

United Nations
Educational, Scientific and
Cultural Organization

World Heritage

Man and the Biosphere

UNESCO Global Geoparks

Australia's UNESCO Sites

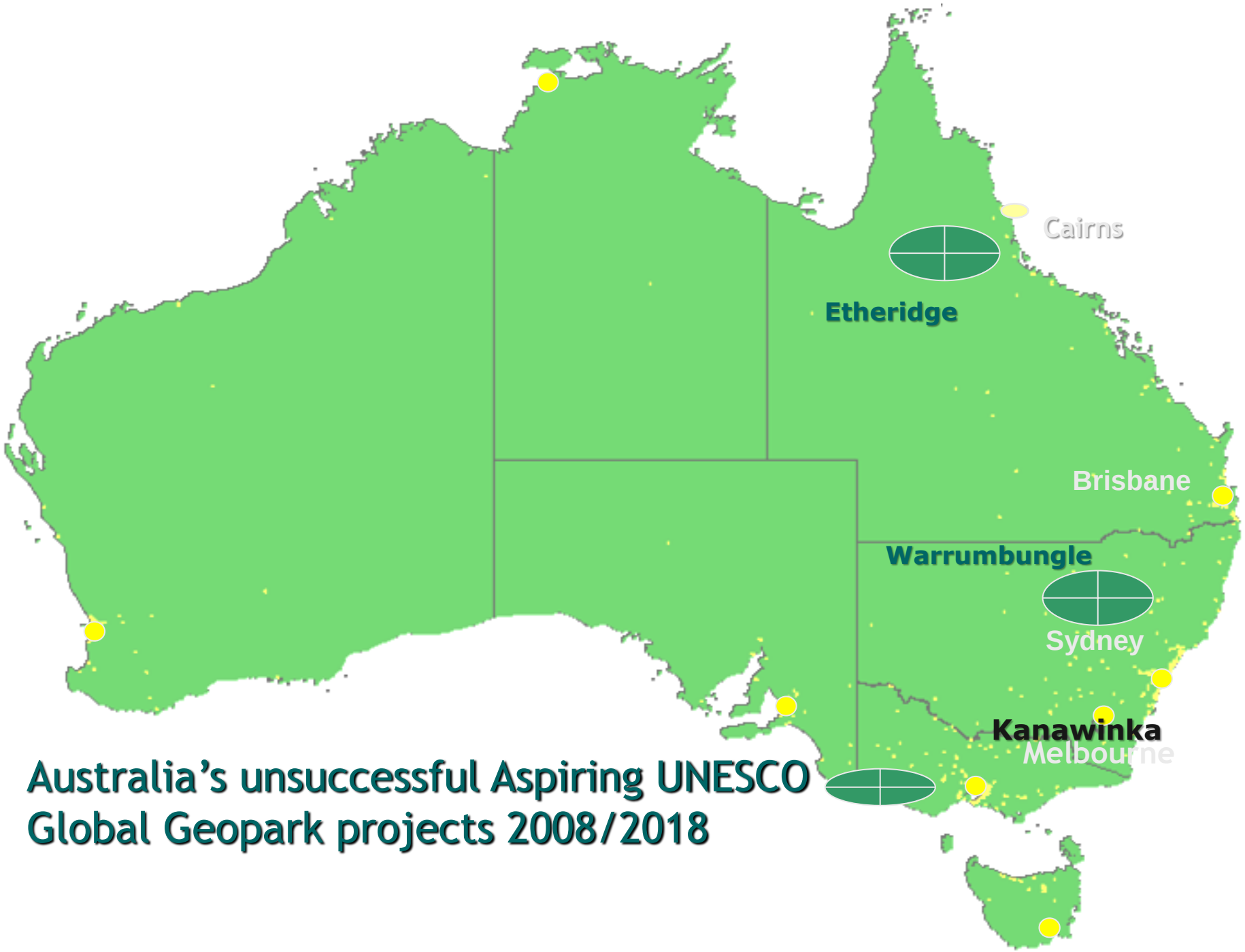
Program	Sites
World Heritage, not including the FRWHA nomination (SA) or the proposed Central Victorian Goldfields WHA listing.	20
Man and the Biosphere	4
UNESCO Global Geoparks	0

There are currently 177 Global UNESCO Global Geoparks in 46 countries, of which 41 are located in China, and one for NZ next year.

UNESCO GLOBAL GEOPARKS

UNESCO Global Geoparks are single unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development.

While a global geopark must demonstrate geological heritage of international significance, the purpose of a geopark is to EXPLORE, develop and celebrate the links between that geological heritage and all other aspects of the areas natural, cultural, and intangible heritages.



Australia's unsuccessful Aspiring UNESCO Global Geopark projects 2008/2018

Australian Government policies relating to geopark development

- In November 2009, Environment and Heritage Ministers decided, after consultation with Resource Management Ministers (advised by Geological Surveys), that whilst Australian governments support geological heritage, they had significant concerns with the application of the UNESCO Geoparks concept in Australia, especially without government endorsement. Existing mechanisms are considered sufficient to protect geoheritage.

- This represents currently the only formal policy decision of all Australian Governments relating to geoparks.

Three lessons learnt - geotourism development

1. KANAWINKA – Both State Governments and the Australian Governments need to approve UNESCO geopark development.

2. WARRUMBUNGLE – non-protected areas deemed to have future exploration and mining potential are ‘off limits’ for geopark development.

3. ETHERIDGE – existing land holders e.g., graziers don’t like changes to the status quo and are wary of tourism development and UNESCO involvement.

Why a National Geotourism Strategy?

- Unique opportunity for engaging the broader community with geoscience.
- With COVID-19, domestic tourism is now looking for innovative product development.
- Major opportunity for rural and regional development, focusing on both natural and cultural heritage, both mining and Aboriginal.
- Emerging grass-roots community support for a range of geotourism projects nationally.
- To gain support of geotourism projects by governments through the Geoscience Working Group (GWG).

National Geotourism Strategy Goals

1. New digital technologies.
2. To define an approval pathway for major geotourism projects - (Mission Critical)
3. To establish a framework for creating high quality geotrails.
4. To establish a national listing for geoheritage sites suitable for geotourism.
5. To develop geotourism in regional mining and Aboriginal communities.
6. To strengthen Australia's international geoscience standing.
7. To develop and enhance geoscience interpretation and communication skills.

Defining a GeoRegion (a local construct) - the first step in evaluating its potential development for geotourism projects including geoparks.

Goal 2

- An area defined by a proponent (which might include for example a LGA or a RDA) having completed an approved tourism Destination Management Plan (DMP).
- And the proponent now wishes to seek agreement from the State/Territory Geological Survey and other agencies to designate a defined area of particular natural and cultural heritage which highlights outstanding geoheritage features.

Societal benefits of developing a GeoRegion for geotourism

- By celebrating the geological heritage of an identified GeoRegion, and in connection with all other aspects of the area's natural and cultural heritage (and most significantly, Aboriginal heritage), geotourism enhances awareness and understanding of key issues facing society.

- Geotourism gives local people a sense of pride and strengthens their identification with a GeoRegion.

Over-riding socio-economic benefits of geotourism for GeoRegions

- Measurable economic benefits through enhancement of traditional nature-based tourism - additional visitors, direct and regional economic output, household income and wages, and local (including Aboriginal) employment.
- Through establishment of a higher level of centralised coordination in areas of product development, travel and hospitality services, tourism promotion/branding.
- Through its defined mission, community engagement is maximised and measured.

AGC's preferred approach Goal 2 – the 'Exploration Licence'

- Emphasise the concept of identifying *GeoRegions* not Geoparks in key areas of outstanding geoheritage, with early consultation with Geological Surveys (the GWG) to address their requirements.
- Initially focus on developing geotrails within these GeoRegions to build community, business, State/Territory Government support.

National Geotourism Strategy (NGS) Goal 2

- Hence the absolute need to define an approval pathway for major geotourism projects, implemented by the AGC in consultation with Australian governments (GWG).

- Three Pilot GeoRegion Projects supported by the NGS.
  - Ku-ring-gai, Sydney, NSW.
  - Murchison, Mid West, WA.
  - Glen Innes, New England Highlands, NSW driven by a LGA approved Tourism DMP

AGC Submission to the GWG

- Based on the work in support of Goal 2, a submission approved by the full Council of the AGC sets out a proposed approvals pathway for GeoRegion and potential aspiring geopark development.

- This submission has been submitted to the Geoscience Working Group (GWG) for consideration and approval.

Goal 5

Addressing cultural landscapes

- Goal 5 identifies opportunities for geotourism in rural and regional Australian post (or active) mining communities, where surfaces are exposed by mining, and their recreational, educational, and cultural values can be realised.

- With the active support of The AusIMM, Goal 5 aims to draw attention to these places, and to the range of activities that could be conducted in these places. e.g. Central Victorian Goldfields.

Diversity of geotourism and mining heritage

- Existing and abandoned mining sites.
- Old mining towns e.g., Broken Hill, Burra.
- Historic mining regions e.g., West Coast Tasmania, Herberton and Etheridge Far NQ; Blinman, SA.
- Economic Geology geosites e.g., gossans, alteration zones e.g., Broken Hill and Arkaroola.
- Old mine site complexes combining mining, museums, ecological interpretation, history and culture e.g., Hill End, NSW, Illawara and Lithgow Coalfields, NSW.
- All underpinned by RICH STORIES.


GEOTRAIL: OUTCROP OF OREBODY
MENINDEE ROAD
Seen here is a vestige of original Broken Hill outcrop which is known as Gossan.
This Gossan is the weathered surface remnant of an underlaying Silver-Lead orebody.

Key issue for the resources industry

Goal 5

- The acknowledgement of Aboriginal cultural heritage beyond the benefits offered through geotourism includes the need to ensure it is appropriately protected.
- This will ensure the preservation of Aboriginal cultural heritage is equally as important as that of mining and other aspects of cultural landscapes, thus leading to improving the public perception of mining professionals and the industries in which they work.

THRIVE 2030 Visitor Economy Strategy and Geotourism

Actions 7.5 and 7.7

- 7.5: ‘Grow and develop high-quality products and experiences around unique Australian locations and themes, including approaches which integrate sustainable nature tourism with economic opportunities for Traditional Owners, and capitalising on emerging tourism trends such as geotourism.’

- 7.7: ‘Enhance the visitor experience through use and availability of technology.’

Best practice geotrails

Goal 3

- Should be constructed around routes currently used by tourists; regional geotrails should form logical journeys linking accommodation destinations.
- Should meld the geological heritage features of a region with a cohesive STORY.
- Should incorporate and package in the biodiversity and cultural components (including mining heritage) of the area through which the geotrail traverses.

Best practice geotrails in NSW

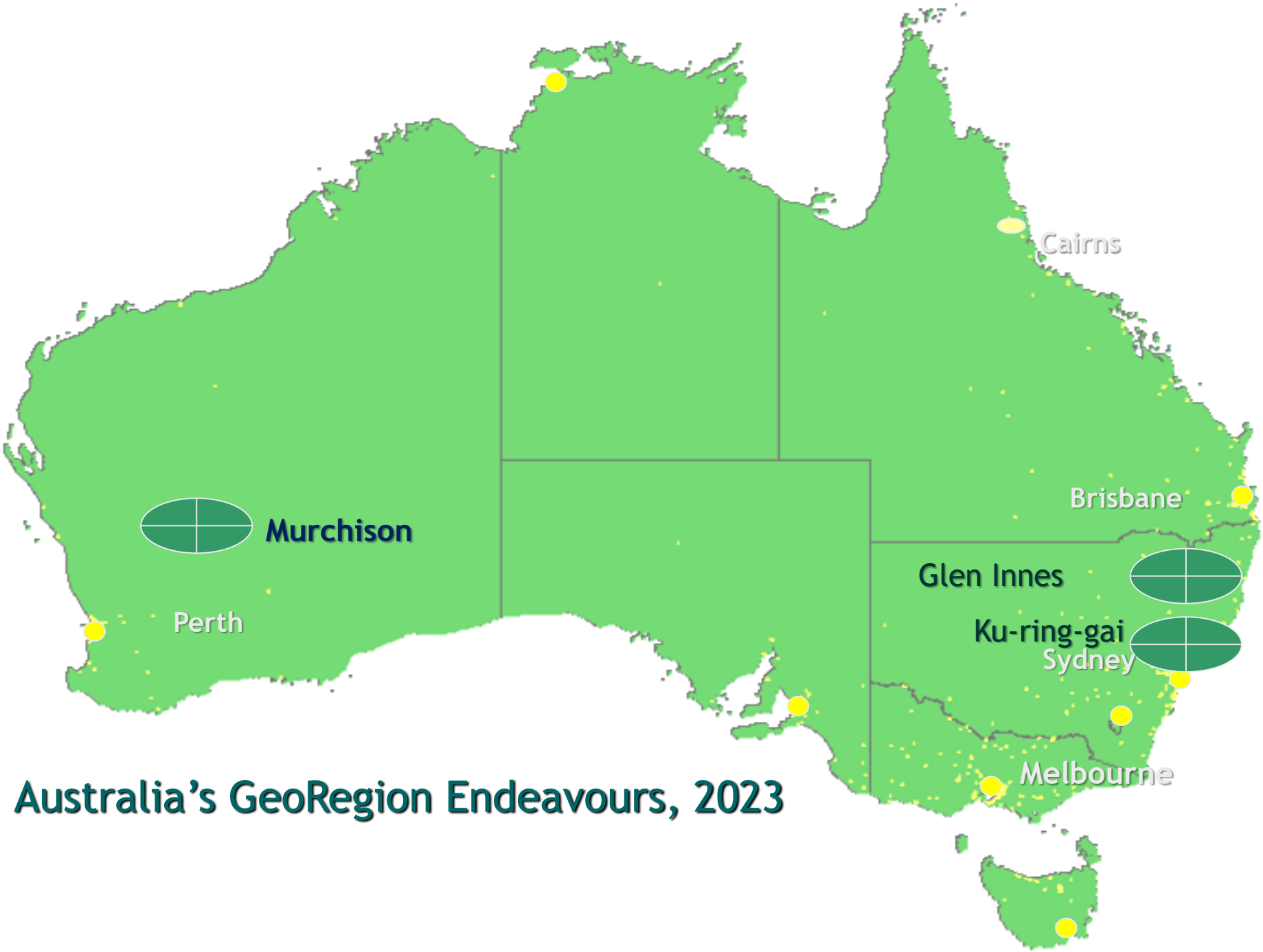
- Warrumbungle National Park geotrails.
- Newcastle Coastal Geotrail.
- Central Darling Geotrail.
- Mutawintji National Park.
- Port Macquarie Coastal Geotrail.
- All with substantial GSNSW input.


PORT MACQUARIE COASTAL
geotrail
Port Macquarie Coastal Geotrail
YOU ARE HERE
STOPS
Volcanoes under the sea
Death on the seafloor
Sediments move from land to sea
Down the subduction zone
Rare rocks from deep Earth
pmhc.nsw.gov.au/coastalgeotrail
SONY

National Geotourism Strategic Goals

Aligning with THRIVE 2030 & State-based strategies

- Consideration of new digital technologies e.g., 3D visualisation, AR & VR etc ('cutting edge' work). Goal 1 and Action 7.7
- To define an approval pathway for major geotourism projects. Goal 2 and Action 7.5
- To establish a framework for creating high quality, sustainable geotrails. Goal 3 and Action 7.5
- To develop geotourism in regional mining and Aboriginal communities Goal 5 and Action 7.5



Australia's GeoRegion Endeavours, 2023

Ku-ring-gai GeoRegion

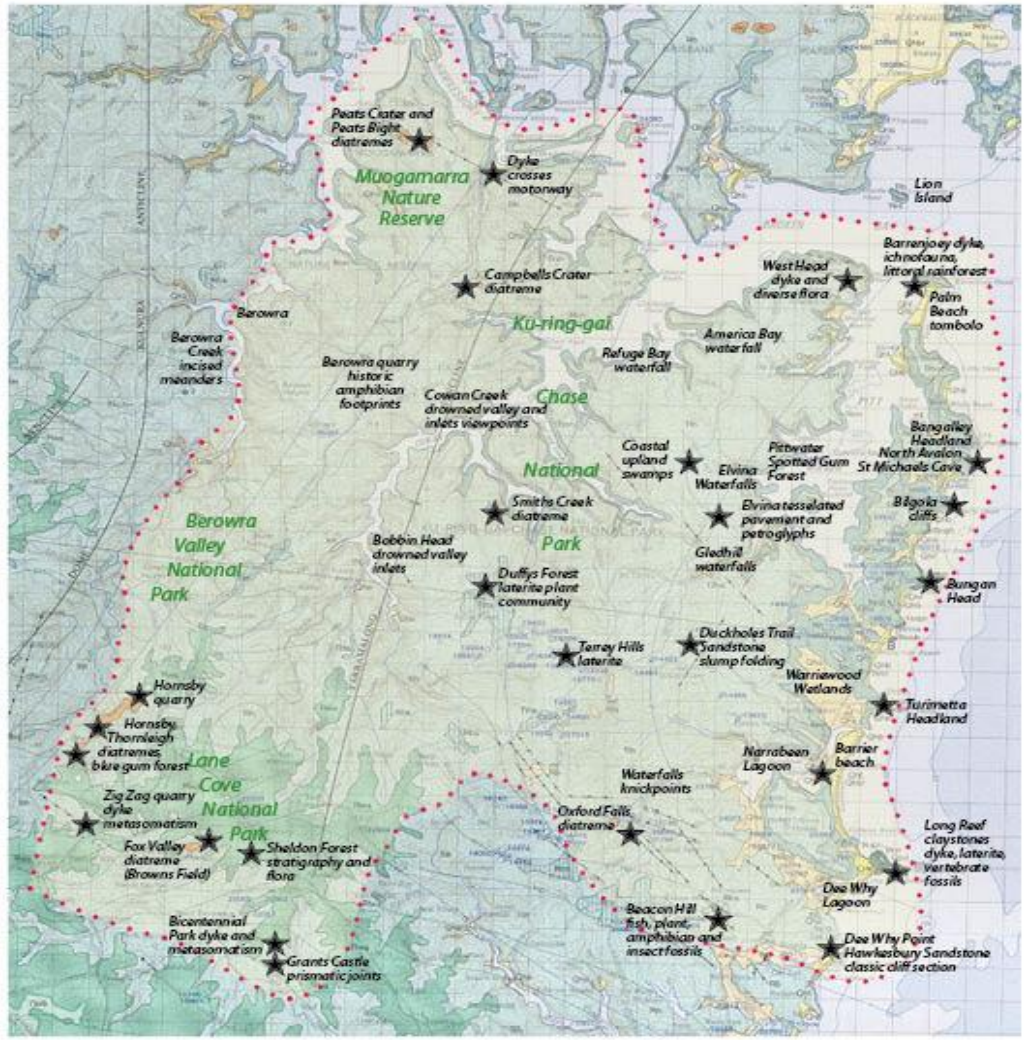
- Conceived in 2018 by a community group – FOKE and now supported by other community groups.
- 440 sq kms in area, embracing both national parks and the Northern Beaches of Sydney.
- Supported by NPWS, three Councils, and local MPs.
- Approved by the GSNSW.
- Major natural and cultural heritage peer-reviewed, review paper published by the Linnean Society of NSW.
- 50+ sites and six formative geotrails.

‘Ku-ring-gai’ GeoRegion sites

- Cliffs, beaches and lagoons from Long Reef to Barrenjoey.
- Ku-ring-gai Chase National Park.
- Muogamarra Nature Reserve.
- Northern Garigal National Park.
- Eastern Berowra Valley National Park.

Showcasing:

- Numerous significant geological sites.
- Rare and threatened flora and fauna tied to the geology.
- A human history dictated by the landscape.



Why?

- Conservation of our treasured environment.
- Areas of rare and threatened flora and fauna.
- Some of the best aboriginal rock engraving sites in Australia.
- Numerous national and internationally significant geological sites
  - the best exposed geological section of early to mid-Triassic period (240 million years ago) sedimentary rocks in the Sydney Basin.
  - Diversity of fossils reflect past environments over nearly 50 million years.
  - Includes eight volcanic diatremes (pipes) with the Hornsby diatreme being perhaps the best exposed of its type in the world.

What is Geoheritage?

Geological or landform features that are unique or excellent scientific or reference sites which:

- promote awareness and appreciation of our geological heritage;
- record evidence of past environments; and
- provide opportunities for geotourism.

The creation of new geotrails can demonstrate significant tourism and regional economic benefits.

Potential to develop into a UNESCO Global Geopark.

The Landforms Today

- Deep valleys, extensive estuaries, pocket beaches, cliffed headlands and coastal lagoons formed by post-glacial sea level rise.
- Diverse rock types on the plateau and slopes support a high diversity of endemic flora and fauna.
- Much of the ‘Ku-ring-gai’ GeoRegion is reserved as near pristine bushland adjacent to urban Sydney.
- Medium term opportunity for a UNESCO Global Geopark given the close proximity and tenure of these identified geosites.

Requirements for a UNESCO Global Geopark

- Must contain geosites of national and international significance.
- Must have been functioning as a ‘defacto’ geopark for at least one year with geotrails, signage, promotional material, and management.
- Must have received awards or formal recognition in geodiversity, conservation or sustainable geotourism.
- Must involve strong community support.

Geotrail development in the Ku-ring-gai GeoRegion

- Since 2021 we have been in a working partnership with:
  - NSW National Parks and Wildlife Service; and
  - three local government agencies - Hornsby, Ku-ring-gai, and Northern Beaches.
- Showcase accessible and well-known visitor-friendly geological locations.
- Enable visitors to understand the relationship to flora and fauna, Aboriginal culture, thus enriching their visits to the GeoRegion.
- Raising the awareness of the natural and cultural heritage of our area will lead to better conservation and protection outcomes.

Our Approach So Far

Stage One:

Identify and establish geosites/geotrails with the support of NPWS (within their new management plan?), local Councils, Destination NSW, Aboriginal and community groups. Engage also with local school communities.

Stage Two:

With State Government & LGA approval and funding and with community endorsement, seek Australian Government support for a nomination to UNESCO of a designated area as an Aspiring Global Geopark.

Stage One Progress

- NSW Geological Survey has endorsed the project.
- Working with Hornsby, Ku-ring-gai and Northern Beaches Councils and the NPWS we have identified initial ‘geosites and geotrails; finalising signage and formats for the geotrails under development.
- Have support from local politicians.
- Have completed a 98 page, peer-reviewed paper of ‘The Natural and Cultural History of the Ku-ring-gai GeoRegion’.

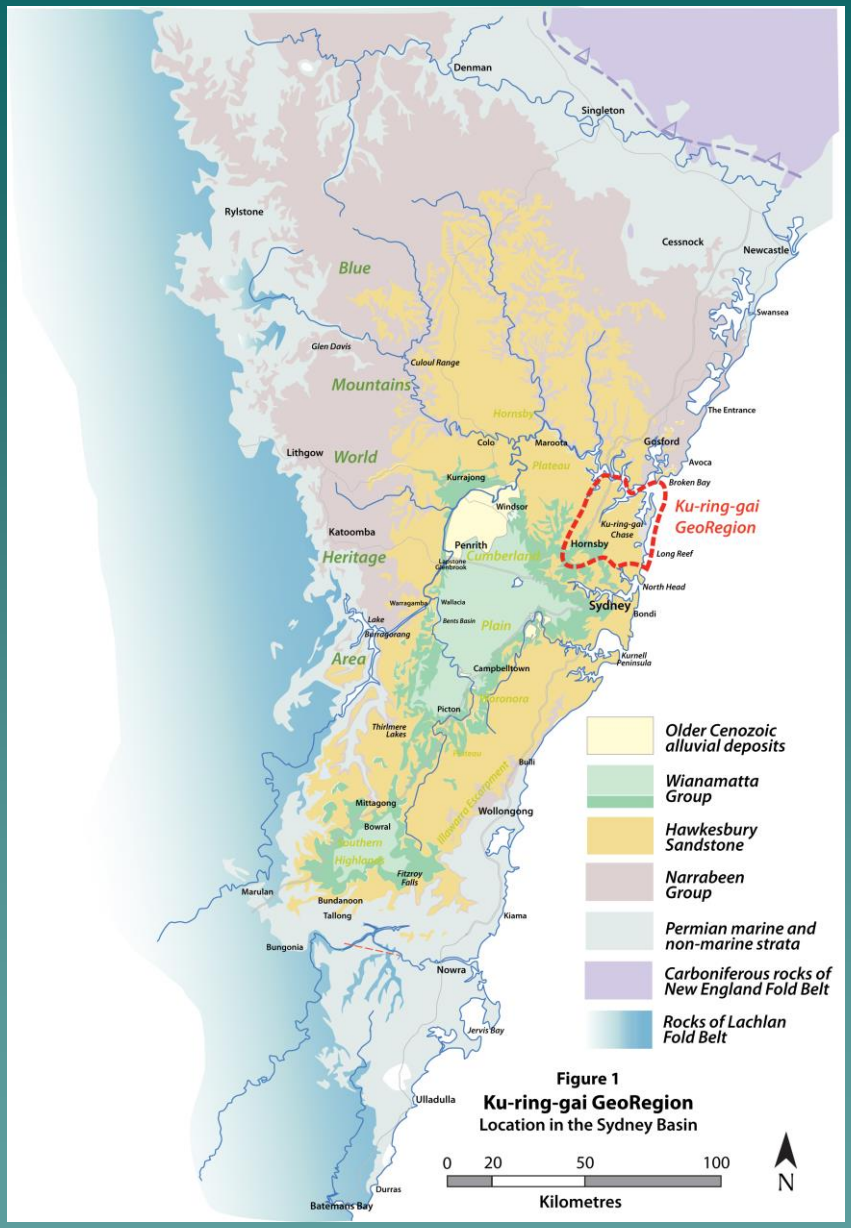
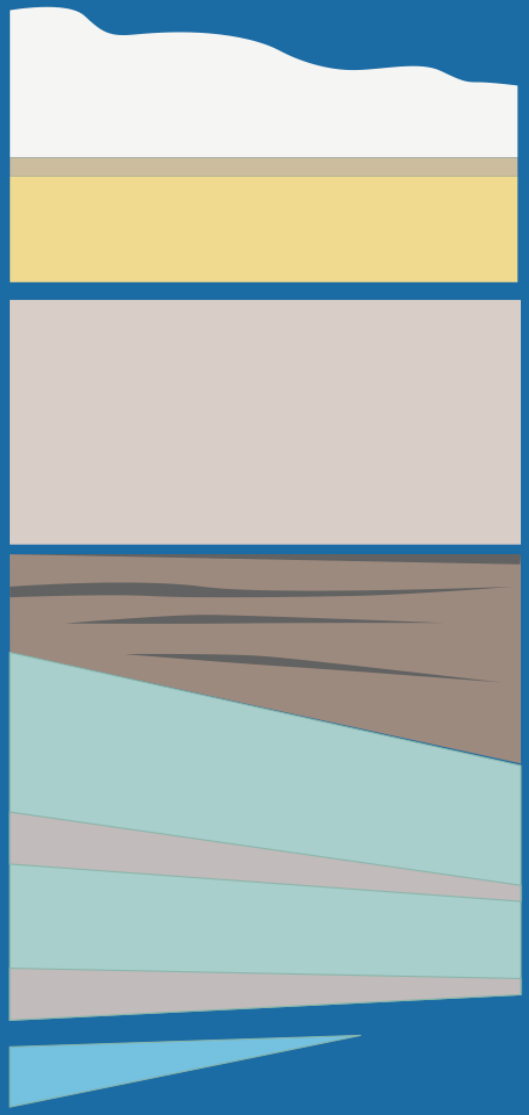


Figure 1

Ku-ring-gai GeoRegion

Location in the Sydney Basin



Triassic

End-Permian extinction
252 million years

Permian

Wianamatta Group
Shales, thin sandstones

Mittagong Formation
Hawkesbury Sandstone

Narrabeen Group
Sandstones, conglomerates, mudrocks

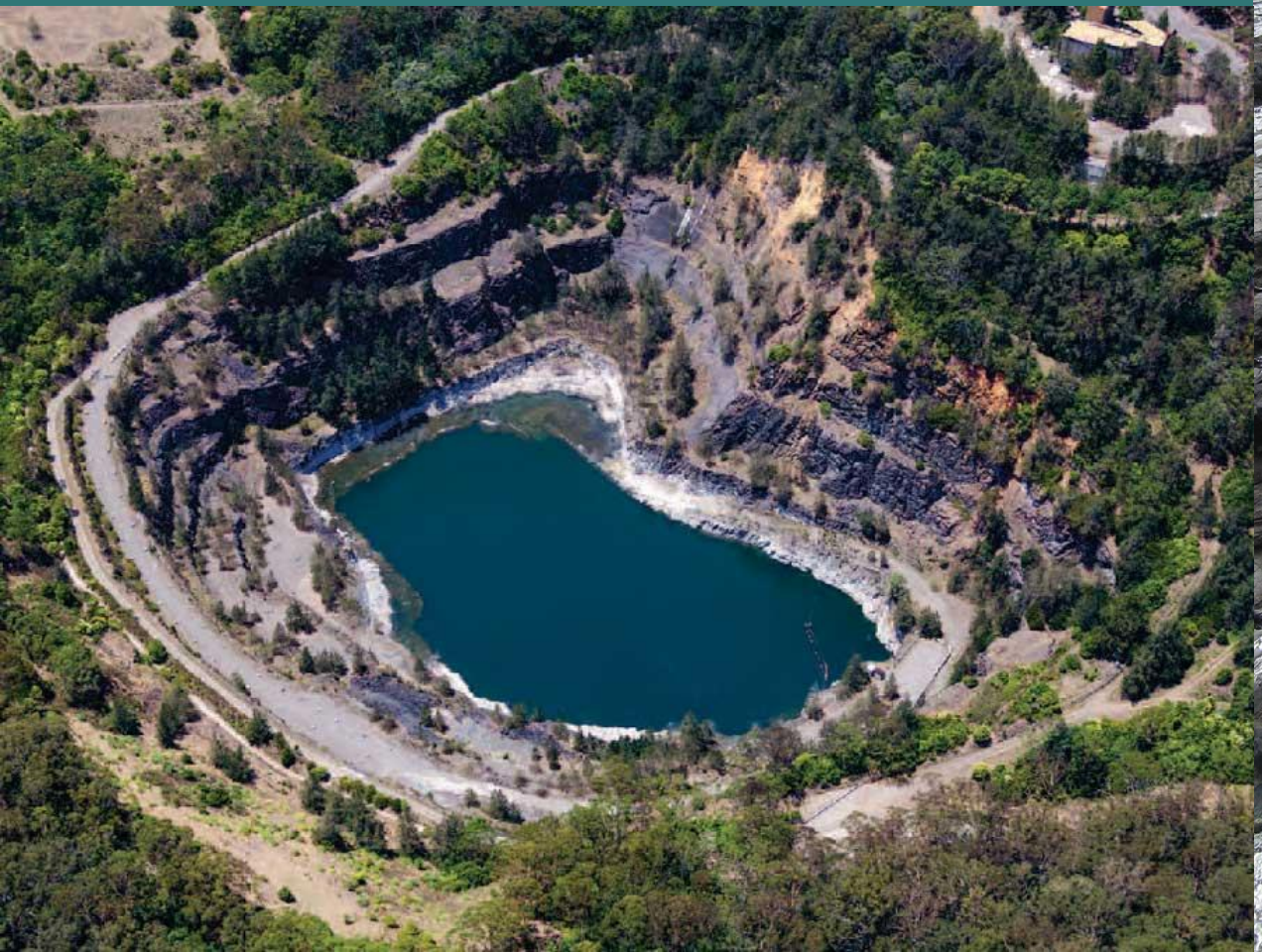
Singleton Supergroup
Newcastle, Tomago, Whittingham Coal Measures
Illawarra Coal Measures

Shoalhaven, Dalwood and Maitland Groups
Marine shales, siltstones, sandstones with fossils; conglomerates, volcanic rocks ice-rafted dropstones, minor coals

Talaterang Group


Umina Beach
Peats Bight diatreme
Peats Crater diatreme
Cobar Ridge diatreme
West Head
Barrenjoey
Campbells Crater diatreme
Berowra
St Michaels Cave – Nth Avalon Hd
Avalon Beach
Smiths Creek diatreme
Bayview
Terrey Hills
Hornsby diatreme
Thornleigh diatreme
Hornsby
Warriewood
Lineament (possibly dyke-related)
Dyke, mapped or inferred
Oxford Falls diatreme
St Ives
Long Reef
5 km
2

Two Significant Geological Features – a Jurassic diatreme (pipe) - exposed in Hornsby quarry, and an igneous dyke on Long Reef shore platform



Rare and Threatened Flora within the ‘Ku-ring-gai’ GeoRegion

Darwinia biflora

Tetratheca glandulosa

Grevillea caleyi

Fauna of the Northern Beaches (27 km) and Inland

- **Reptiles**, including sea-snakes and turtles.
- **Birds**, a very large variety of species inc migratory shorebirds.
- **Marine animals**, including whales, dugong, seals
- **Land-based animals**, reptiles, amphibians, mammals including possums, gliders, marsupials, and monotremes.

Threatened and Rare Species with core or sole densities within KCNP, Muogamarra Reserve and Garigal NP.

Rockwarbler

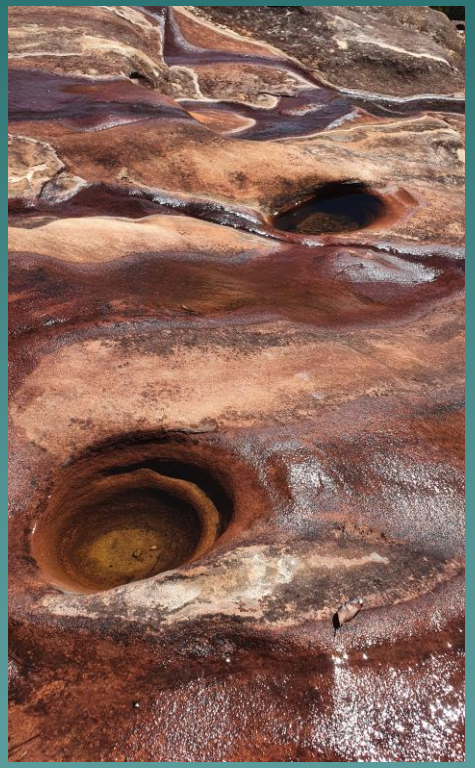
Red-Crowned Toadlet

Southern Brown Bandicoot (EN)

Area is Dense with Aboriginal Sites

Some of the best Aboriginal rock engraving sites in Australia

Basin Track engravings



Grinding grooves located below sandstone rockpools

A number of engravings including Daramulan holding a boomerang, possibly part of a ceremonial site.

Ku-ring-gai Georegion	Number of Types		No in Protected Areas		Elevation mASL		Slope Degrees		Distance To Freshwater		Distance To an Estuary/Coast	
Site Types	No.	% of Total	No.	% of Total	Average	SD	Average	SD	Average	SD	Average	SD
Rock Engraving	647	38.8%	434	67.1%	120	57	8	6	229	176	815	640
Shelter with Art	389	23.3%	300	77.1%	61	59	16	8	231	215	376	599
Shelter with Midden	166	10.0%	133	80.1%	33	29	16	7	252	258	103	229
Open Deposit	145	8.7%	79	54.5%	27	43	13	7	338	351	126	316
Axe Grinding Groove	111	6.7%	66	59.5%	121	56	9	6	155	165	902	623
Shelter with Deposit	97	5.8%	45	46.4%	57	56	12	7	379	381	513	864
Midden	63	3.8%	37	58.7%	24	36	13	7	376	391	119	297
Stone Arrangement	16	1.0%	11	68.8%	142	24	8	5	137	75	734	489
Burial	11	0.7%	4	36.4%	22	35	11	11	540	456	166	386
Water Hole/Well	8	0.5%	4	50.0%	102	59	8	5	160	181	971	725
Habitation Structure	6	0.4%	3	50.0%	111	46	13	4	630	826	1023	697
Scarred Tree	5	0.3%	0	0.0%	149	41	8	4	286	102	1541	781
Quarry	2	0.1%	1	50.0%	138	33	5	2	399	18	433	145
Fish Trap	1	0.1%	1	100.0%	15	0	5	0	31	0	22	0
Total of Site Types	**1667**	**100.0%**	**1118**	**67.1%**	**82**	**65**	**12**	**8**	**253**	**254**	**541**	**656**

GeoRegion Geotrails Under Development

- Thornleigh/Hornsby geotrail.
- Browns Field geotrail.
- Sheldon Forest geotrail.
- West Head geotrail.
- Long Reef geotrail.
- Berowra Waters geotrail.
- Managed by the KGR Geotrail Development Group of NPWS, the three Councils & the Steering Committee


COLLAROY BASIN
OCEAN GROVE
ROAD
Park
FISHERMANS BEACH
Club
Park
CRESCENT
HAY STREET
CRESCENT
LONG REEF POINT
LONG REEF BEACH
200m
N
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Long Reef Geotrail
Northern Beaches Council

The Northern Beaches Council have agreed that a walk around the perimeter of Long Reef Headland would made an ideal geotrail.

- Safer than most coastal sections;
- Very well known for its inter-tidal ecology - the Coastal Environment Centre;
- Embraces 17 geosites around the base of the headland;
- Will include interpretive data about the geology of the headland; and
- The walk already existed and visited by many school children and others.

Long Reef Headland Geotrail

- With the help of QR Codes, it will ‘read the rock record’ and develop stories about the landscape, see the current version of the geologic history of the headland and reveal the points of evidence.
- Geosites include volcanic dykes, significant trace fossil burrows including the discovery site of the fossil *labyrinthodont*.
- It also shows several points of human history such as Aboriginal land use, fishing, shipwrecks, copper staining at the legendary mine, and conservation.
- At the southern end of the geotrail, Long Reef Beach is fronting Dee Why Lagoon and is an example of Ice Age legacy and active coastal change.

Ku-ring-gai Municipal Council Geotrails

The Council already have a number of trails in the Hawkesbury Sandstone hill slopes and Ashfield Shale caps that now need a geology/landscape story to become a cohesive geotrail.

- The proposed Browns Field Geotrail in Wahroonga covers 16 possible sites which are easily accessible and are interconnected.
- The existing Sheldon Forest walking track just south of the Turramurra shops is another popular walking track.
- By adding a story of the geology and landscapes, it would add more valued interest to this track.

KMC Browns Field Geotrail - Fox Valley Diatreme

- Showcases highly weathered outcrops of quartz-poor fragmental volcanic rocks interlayered with much finer grained bedded rocks of possible crater-lake sediments.
- Entrained Permo-Triassic wall rock clasts are common with outcrops of intensely weathered volcanic breccia.
- Fine grained bedded clastic rocks are sliced up by a steeply dipping fault zone, with blocks of Hawkesbury Sandstone.
- The rainforest on the Cooper Crescent outcrop is rich and diverse.

Ku-ring-gai GeoRegion

Fox Valley diatreme Browns Field

This diatreme is one of around 150 of Jurassic age in the Sydney Basin. Its diameter is about 300 metres with extensions on its eastern and western sides. Exposures of the diatreme's rocks are limited to small outcrops on the creek banks and bed east of the oval and consist of layered sedimentary rocks and volcanic fragmentals containing basalt, sandstone, shale and coal. The diatreme is otherwise concealed by soil, vegetation and Browns Field oval.

A diatreme is a volcanic pipe formed by many gaseous explosions

Surface of a Jurassic maar volcano 170-200 million years ago and long eroded away

You are now standing in a modern landscape scooped out by that erosion

Hawkesbury Sandstone

Narrabeen Group Sandstones, shales & conglomerates

Coal Measures

Permian marine shales & siltstones with lots of shelly fossils

Basalt magma provided heat and broken up basalt clasts and forced the diatreme to the surface

The diatreme rocks can be viewed below the creek crossing at the start of the walk. The blocks in the bank are large fragments of Hawkesbury Sandstone torn or slumped from the diatreme's walls during the hot-gas driven volcanic event.

Stream bed outcrop: volcanic fragmental rock made of broken pieces of light green-grey basalt.

Fragments of dark grey shale are scattered through this mixture of sandstone and volcanic matter from stream bed outcrops.

Microscopic fragments of coal less than 1mm across in a section of diatreme rock broken from the stream bed. The coal was probably torn from coal measures at depth.

LOVING LIVING

Ku-ring-gai GeoRegion

1

Fox Valley diatreme, Browns Field

The Fox Valley diatreme is characterised by rich soils derived from the volcanic rocks deposited during formation.

Relatively undisturbed warm temperate rainforest borders Browns Field while the Cooper Crescent creek valley contains various subtropical introduced rainforest species.

2

3

1 Coachwood *Ceratopetalum apetalum* forest follows the creek line and is common along local creeks.

2 Sassafras *Doryphora sassafras* is a common tree in all sizes at Browns Field with its distinctive and aromatic toothed leaves.

3 Bolwarra *Eupomatia laurina* is a large scrambling shrub with big glossy leaves, fragrant flowers and edible fruit.

4 The brick coloured, sandy trunks of lillypilly *Acmena smithii* are a common sight, as are the distinctive fronds of cabbage tree palm.

4

5

5 The flora along the Cooper Crescent creek line is rich and diverse, including the giant stinging tree *Dendrocnide excelsa*, Bangalow palm *Archontophoenix cunninghamiana*, native rosella *Hibiscus heterophylla* and white bolly gum *Neolitsea dealbata*.

LOVING LIVING

NPWS - Ku-ring-gai Chase National Park

- The Ku-ring-gai Chase National Park (KCNP) suggested areas around West Head Lookout would make a good trail to illustrate the Hawkesbury Sandstone plateau.

- KCNP is regularly traversed annually by tens of thousands of visitors but would benefit from a higher level of interpretive information.

- A geotrail package would illustrate the nature of the geology, landscape, soils, vegetation, and Aboriginal heritage would significantly enhance the overall visitor experience.

OVERVIEW

Main holistic relationships of the KGR

A. Geology and Geomorphology, mantled by the soil profiles, provides the foundation for vegetation communities (flora) that are also in part controlled by proximity to fresh and saltwater and microclimatic conditions.

B. Fauna is dependent on the vegetation for protection, habitat, and food resources.

C. Original Aboriginal inhabitants of the land utilised its abiotic and biotic elements in their daily lives as recorded in the wealth of sites identified.

* Supported by a substantive, co-authored journal manuscript & the KGR report by Dr J E Martyn *

UNESCO Global Geoparks – main focus areas deemed applicable to the KGR

1. Science – continuing abiotic and biotic research activities.
2. Education - developing and operating educational activities for all ages to spread awareness of the geological heritage and its links to other aspects of our natural, cultural and intangible heritages.
3. Local and indigenous knowledge - local community and Aboriginal peoples - by preserving and celebrating their culture.
4. Geoconservation – promoting the concept of sustainability, valuing the heritage of 'Mother Earth' and recognising the need to protect it.
5. Climate Change - effects of current climate change thus giving the opportunity to show visitors how climate change can affect our environment.

Significant focus areas for the KGR

Climate Change

1. As evidenced by the use of drone technology real time impact of climate change along the Northern Beaches coastline is being closely monitored.

2. Climate change is accelerating physical and chemical weathering, as well as the inundation of low elevation Aboriginal sites.

3. The potential for the nomination of an Aspiring UNESCO Global Geopark will provide an opportunity to study the effects of past and present climate change on natural /cultural heritage.

THRIVE 2030 Visitor Economy Strategy and the National Geotourism Strategy

‘Grow and develop high-quality products and experiences around unique Australian locations and themes, including approaches which integrate sustainable nature tourism with economic opportunities for Traditional Owners, and capitalising on emerging tourism trends such as geotourism.’

- Ku-ring-gai GeoRegion identified as an opportunity for aboriginal tourism.
- Good fit with the 2030 NSW Visitor Economy Strategy.

KGR Steering Committee

- Ursula Bonzol and Janine Kitson (FOKE)
- Bob Conroy (former Executive Director, NPWS)
- Dr John Martyn (Geologist, early SMEDG member, author)
- Dr Peter Mitchell OAM # (Environmental scientist)
- David Robson # (Retired GSNSW)
- Angus M Robinson # (Australian Geoscience Council Inc)
- Jayden Walsh (Ecologist)

NGS Steering Committee Member

https://step.org.au/index.php/books/krggeoregion

Where is the Gold in Geotourism?

- New domestic employment and consulting opportunities for geoscientists - interpretation signage/boards, design of geotrails etc; particularly important during mining downturns.
- Consulting opportunities in developing countries where geoparks are now being developed.
- Management roles in geoparks, regional development and local government agencies.
- Opportunity for geology related interests during early retirement.

Gold, Gold, Gold for Australia!

* Australia gains approval for UNESCO Global Geopark development *

As a SMEDG/ AIG member, how can you start exploring for gold?

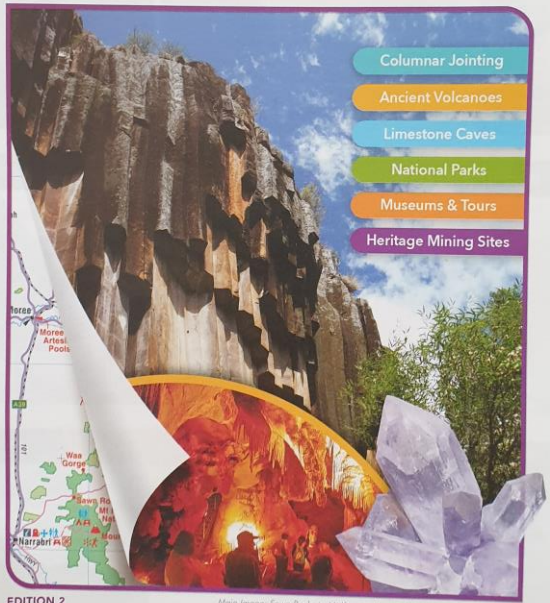
- Participate in the forthcoming AESC 2023 Conference in Perth, 27-30 June, where geotourism is featured as a strong theme.
- Become an active advocate for the National Geotourism Strategy and its objectives!
- Contribute through SMEDG to the funding of KGR geotrails.

CARTOSCOPE
TOURING MAPS

...you're on track

Geotourism Map
Geological Sites of NSW

FREE MAP



EDITION 2

Main Image: Sawn Rocks in Mt Kaputar National Park, Narrabri Map Ref M3
Inset Image: Christmas Tree Chamber in Carey's Cave, Wee Jasper Map Ref L10

CARTOSCOPE (02) 9987 4533
www.geomaps.com.au

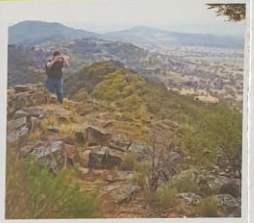
SMEDG
SYDNEY MINERAL EXPLORATION DISCUSSION GROUP

SMEDG is a not for profit organisation that promotes discussion about mineral exploration. Membership and monthly meetings on the fourth Thursday of every month at The Bowlers Club, 99 York Street, Sydney are free. The SMEDG website is a treasure trove of information.

www.smedg.org.au

Coolah Tops National Park

MAP REF M5



Coolah Tops is an elevated basalt plateau at the junction of the Liverpool and Warrumbungle ranges north of Merriwa and east of Coolah and Dunedoo. Columnar basalt formations are found at Tamalie Creek Falls and Bald Hill Creek Falls. The basalt is thought to have originated from vents on the Liverpool Range during the Tertiary period. Five basalt caves of early Oligocene age located in the park appear to have been formed by groundwater erosion.

Evidence of magnetic field reversal (~40mya) is apparent in the volcanic rocks. Cores were drilled from several locations and results show the earth's magnetic field was in the reverse direction from present for all samples.

Log onto www.geomaps.com.au for details on all sites.

Gulgong - Gold Rush Heritage

MAP REF M6

Gulgong's gold rush began in 1870 after Tom Saunders found gold at Red Hill. The find was significant because large amounts of gold were close enough to the surface to be mined with hand tools. Over millions of years the gold bearing quartz from the source rock weathered and the gold migrated downstream via small watercourses. The gold was deposited where the streams lost the velocity to drive it further and became covered with silt. These old creek beds are called leads and were the prime targets for Gulgong's alluvial gold.

Gulgong's streetscape still reflects evidence of the Gold Rush era. Gulgong is located 29km north of Mudgee.

Log onto www.geomaps.com.au for details on all sites.

Hill End - Gold Rush Heritage

MAP REF L/M7

In 1855, gold bearing quartz was worked on the surfaces of Hawkins Hill at Hill End. Between 1870 and 1872, Hawkins Hill yielded very rich deposits at depths ~45m. In 1872, the Beyers and Holtermann "nugget", the largest single piece of reef gold ever discovered (286kg) was found in the Star of Hope mine. In its heyday, about 8,000 people and 52 hotels populated the Hill End area; now there are mine relics, heritage buildings, one hotel and an old-world ambience.

You can stroll along the village streets, take a mine tour, and visit the History Hill gold rush collection, the Cornish roasting pits or Golden Gully. Hill End is 81km north west of Bathurst via Sofala.

Log onto www.geomaps.com.au for details on all sites.

NSW Geotourism Map
200,000 copies printed/distributed

Take-Aways

- Geotourism is being recognised worldwide as a major deliverer of nature-based tourism with geology/landscape at its core.
- The Government's THRIVE 2030 strategy provides the means of gaining tourism industry support for the National Geotourism Strategy in Australia.
- Financial support for the KGR Project will lead to more geotrails being developed.
- Approved geoparks may emerge after initial assessment as GeoRegions.
- Geotourism delivers gold for geologists!

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Information about the National Geotourism Strategy
https://www.agc.org.au/geoscience-in-australia/geotourism/

https://www.youtube.com/watch?v=iOzka7xbrLQ