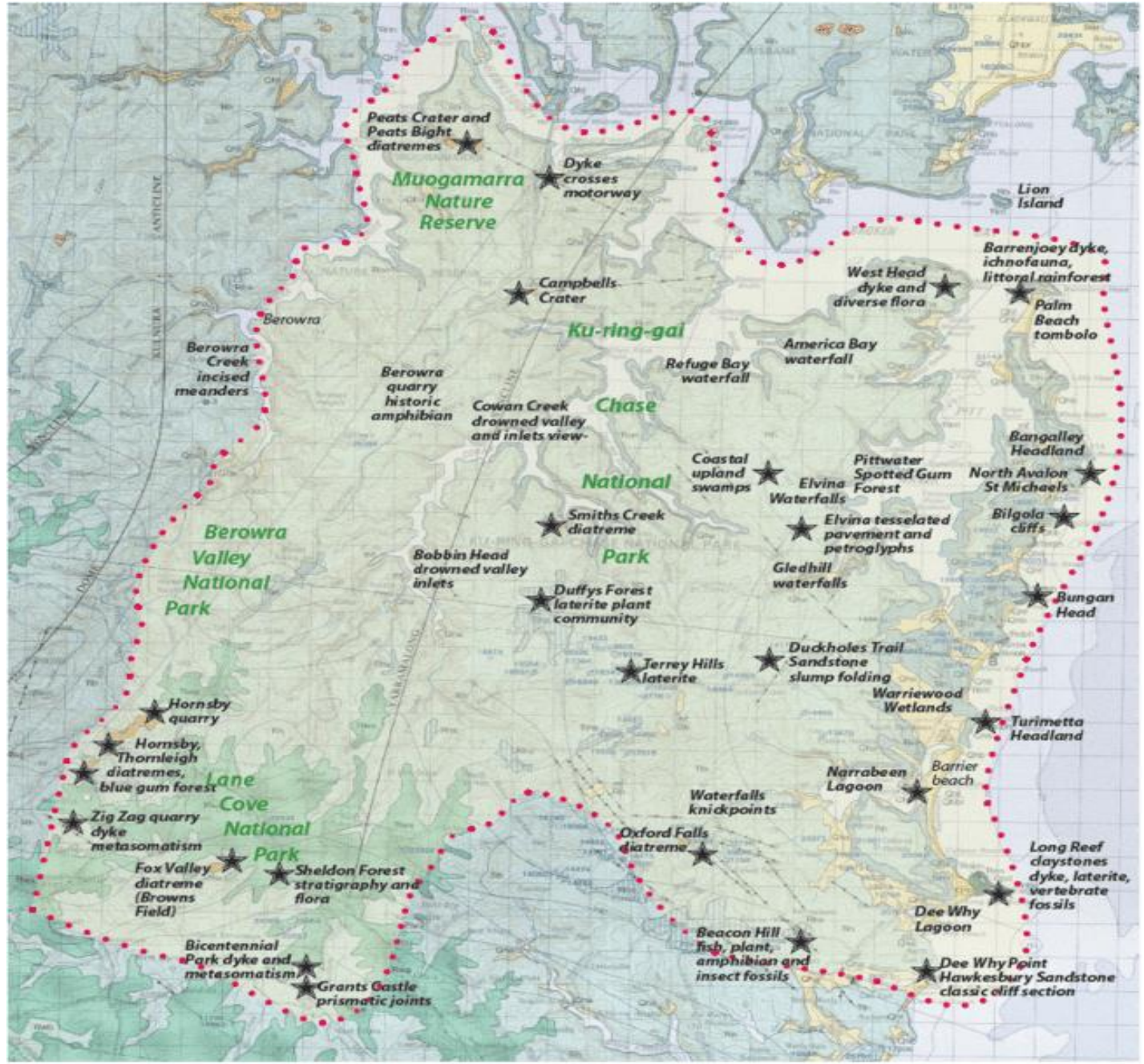
Ku-ring-gai GeoRegion

A world-class wonderland of natural and cultural heritage.

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.


Peats Crater and Peats Bight diatremes
Dyke crosses motorway
Muogamarra Nature Reserve
Lion Island
Barrenjoey dyke, ichnofauna, littoral rainforest
West Head dyke and diverse flora
Palm Beach tombolo
Campbells Crater
Ku-ring-gai
Berowra
Berowra Creek incised meanders
America Bay waterfall
Refuge Bay waterfall
Berowra quarry historic amphibian
Cowan Creek drowned valley and inlets view-
Chase
Bangalley Headland
Coastal upland swamps
Pittwater Spotted Gum Forest
Elvina Waterfalls
North Avalon St Michaels
National
Smiths Creek diatreme
Elvina tesselated pavement and petroglyphs
Bilgola cliffs
Berowra Valley National Park
Bobbin Head drowned valley inlets
Park
Gledhill waterfalls
Duffys Forest laterite plant community
Bungan Head
Duckholes Trail Sandstone slump folding
Terrey Hills laterite
Warriewood Wetlands
Hornsby quarry
Turimetta Headland
Hornsby, Thornleigh diatremes, blue gum forest
Narrabeen Lagoon
Barrier beach
Lane Cove National Park
Waterfalls knickpoints
Zig Zag quarry dyke metasomatism
Oxford Falls diatreme
Long Reef daystones dyke, laterite, vertebrate fossils
Fox Valley diatreme (Browns Field)
Sheldon Forest stratigraphy and flora
Dee Why Lagoon
Beacon Hill fish, plant, amphibian and insect fossils
Bicentennial Park dyke and metasomatism
Dee Why Point Hawkesbury Sandstone classic cliff section
Grants Castle prismatic joints

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

Stage One:

Identify and establish geosites and geotrails with the support of NSW National Parks and Wildlife Service, Local Governments, Destination NSW, Aboriginal and community groups. Engage also with local school communities.

Stage Two:

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

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.
- Should involve strong community support.

Stage One Progress

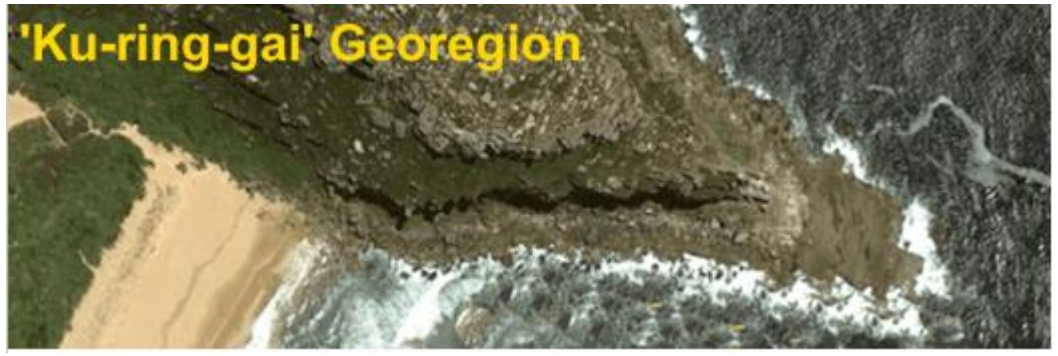
- **NSW Geological Survey has endorsed the project.**
- **Working with Hornsby, Ku-ring-gai and Northern Beaches Councils and the NPWS** we have identified initial ‘Ku-ring-gai’ geosites and geotrails; finalising signage and formats for the geotrails under development.
- **Have support from local Politicians.**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

Holistic Elements of Geotourism/Geotrails

- Geotrails not only link natural landscapes, wilderness and protected areas, but also include human modified environments like quarries, road sections and urban settings.

- The pursuit of geotourism ensures visitors learn about the elements of climate, landscape, geology and soils first, as these determine the living elements of animals and plants.

- These components then determine the cultural landscape of how people have lived in the area in the past, as well as how they live there today. These become the key **elements of geotourism/geotrails**, which delivers a cohesive approach to interpreting natural areas.



GeoRegion Geotrails Under Development

- Thornleigh/Hornsby geotrail.
- Browns Field geotrail
- Sheldon Forest geotrail.
- West Head geotrail.
- Long Reef geotrail.
- Berowra Waters geotrail.

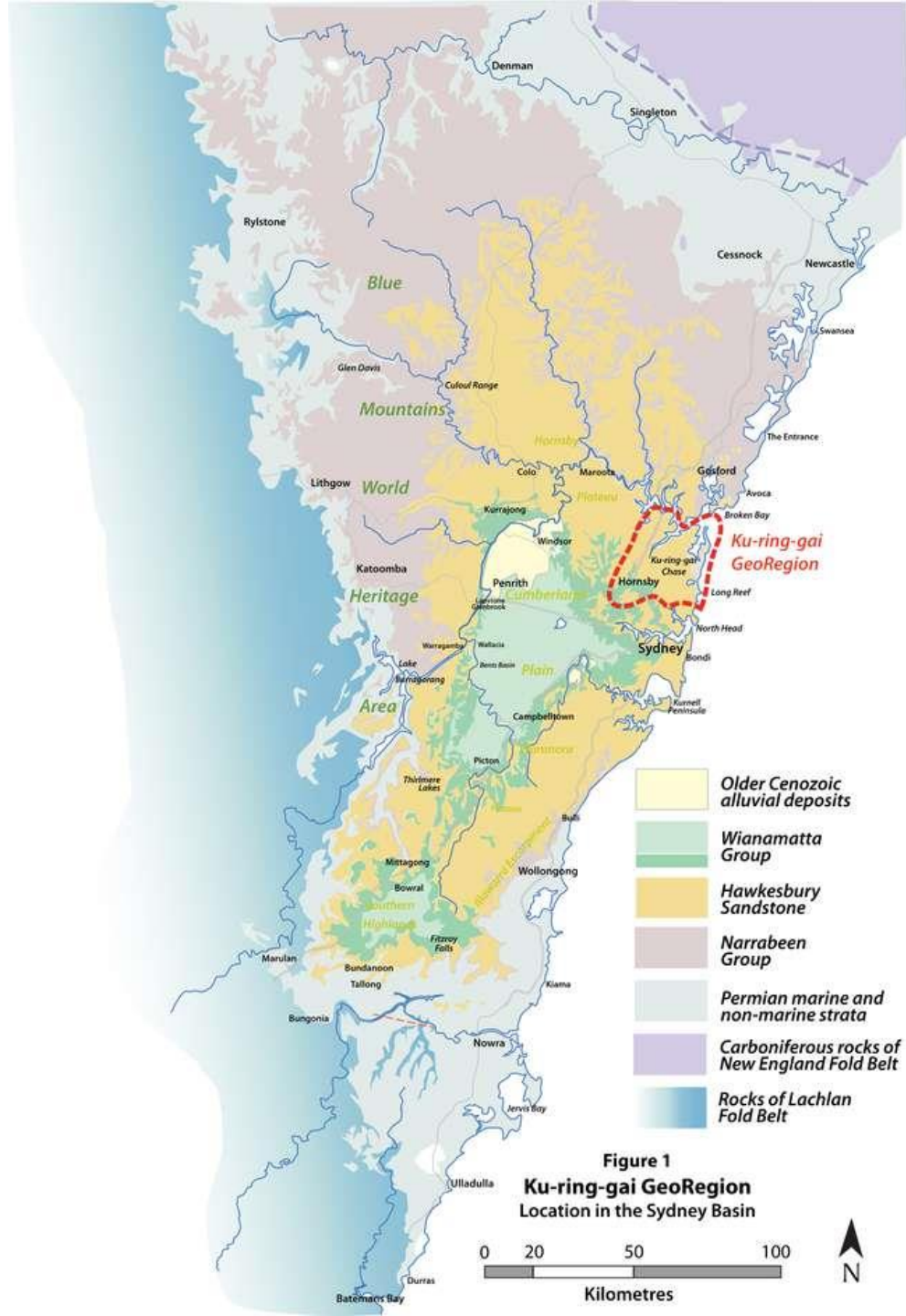
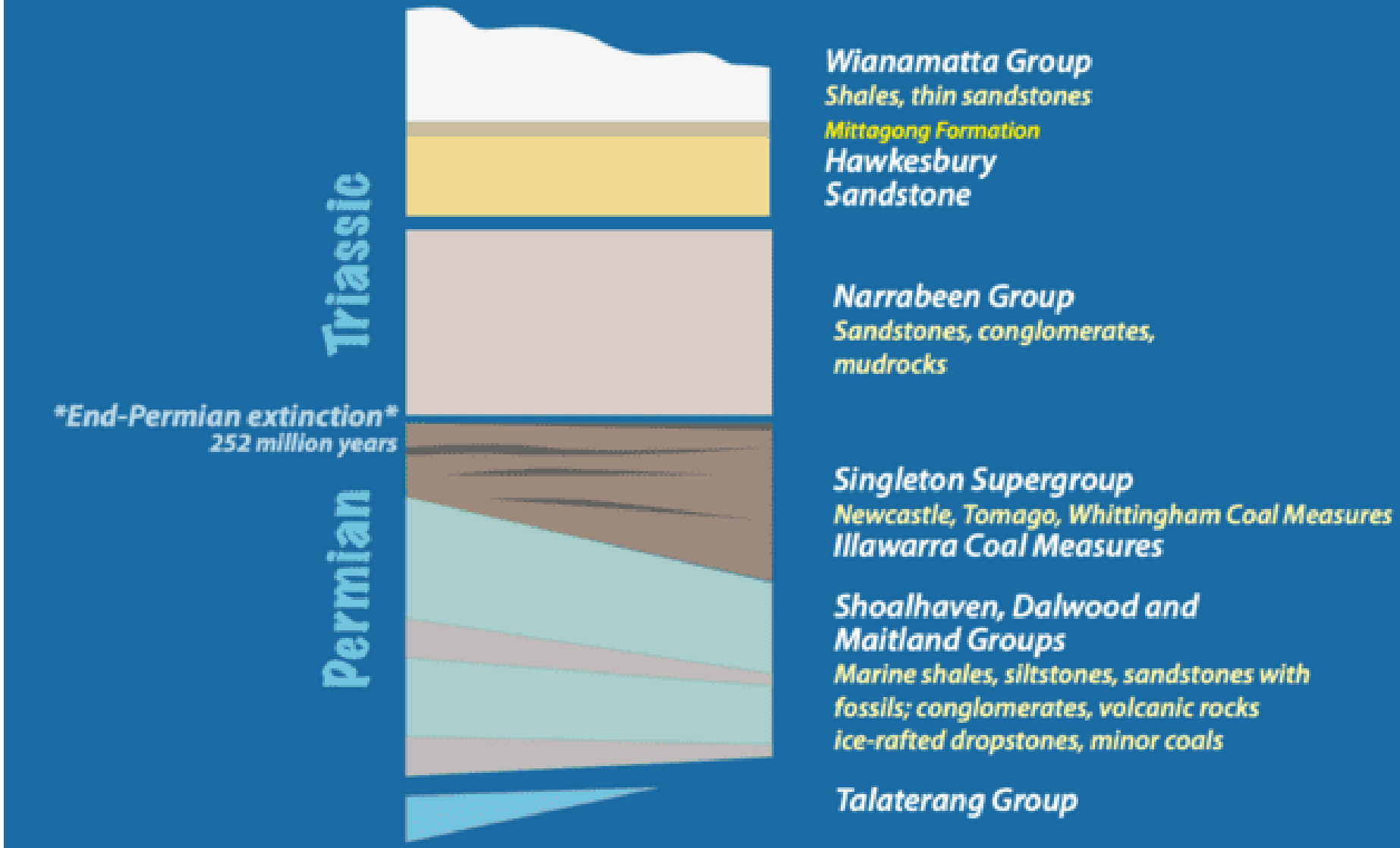
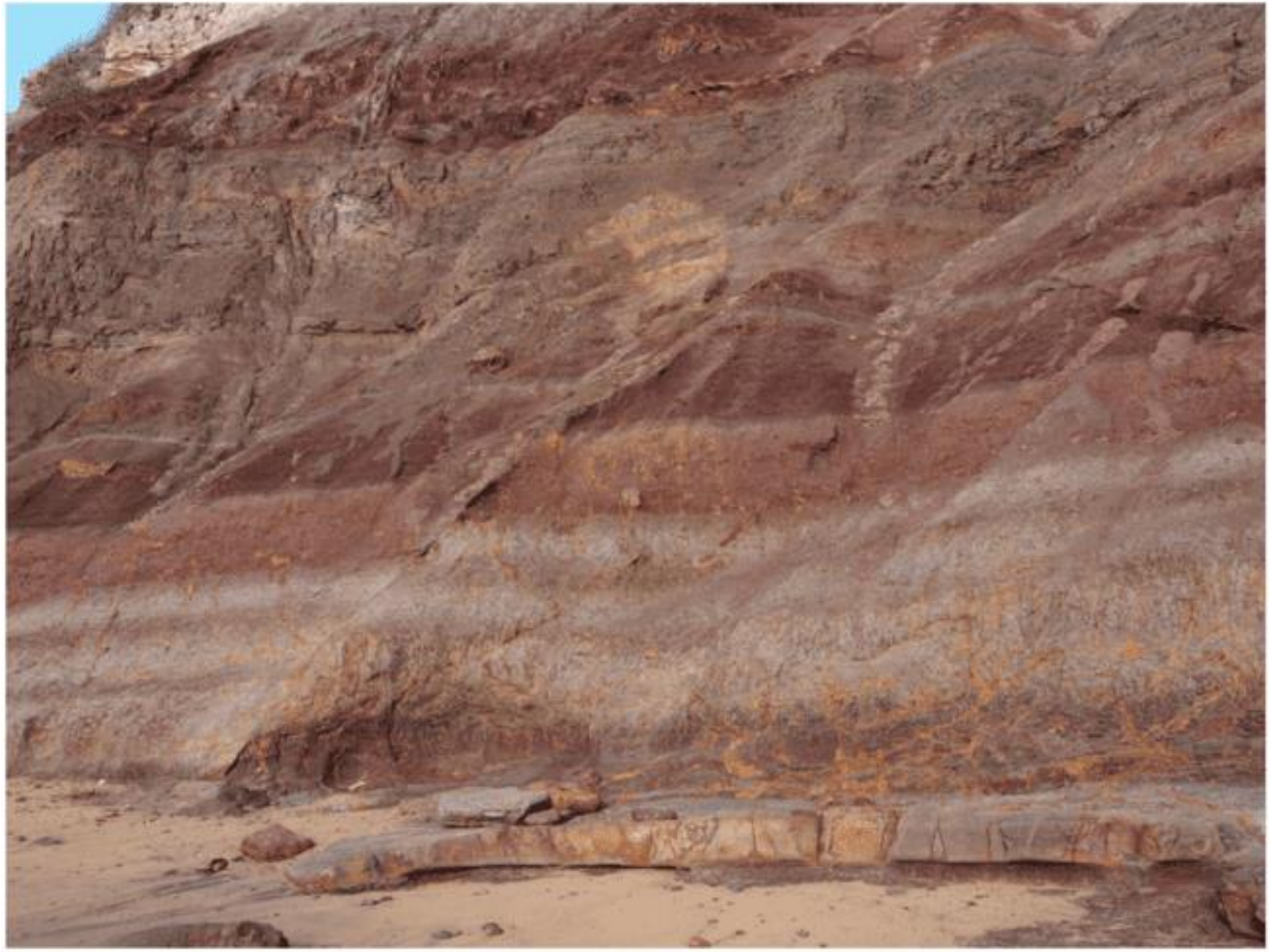


Figure 1

Ku-ring-gai GeoRegion

Location in the Sydney Basin


Triassic
Permian
End-Permian extinction
252 million years
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


Campbell Drive
Browns Field
Cooper Crescent
Sandstone waterfall
Rainforest Close
Inferred fracture trends
Diatreme contact: position reasonably assured
Diatreme contact: position approx. or inferred
T3 – picture locations
200 metres

- In Australia, we have embraced the inclusive nature of the geotourism concept and have understood the inter-relationship between natural and cultural heritage elements.

- 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.

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 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 (Goal 1 of the NGS) 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 Stategy

‘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.

Good fit with the 2030 NSW Visitor Economy Strategy.

National Geotourism Strategic Goals

1. Consideration of new digital technologies e.g., 3D visualisation, AR & VR etc, drones.

2. To define an approval pathway for major geotourism projects (the Ku-ring-gai GeoRegion is one of the two key national pilots).

3. To establish a framework for creating high quality, sustainable geotrails.

4. To enhance geoscience interpretation and communication skills for natural and cultural heritage professionals engaged in geotourism.

Four of the total of seven strategic goals